

# WXES 3182 ELECTRONIC JPJ THEORY TEST TAKING

*Perpustakaan SKTM*

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## ABSTRACT

This project is a step towards realizing our beloved Prime Minister vision of achieving a paperless government in the near future. The existing procedure in taking the JPJ theory test has shortcomings that can be improved by this proposed electronic test taking.

The electronic JPJ theory test taking is focused on the superiority in the questions randomness, security and reliability. In the new procedure, candidate will have to take the JPJ test using computers that are connected in a LAN environment. The computers are divided by cubicles thus unable for the candidate to perform fraud. Questions from the test will be randomly arranged from the existing questions sets. The probability of getting the same arrangement of questions in two sets of questions is near zero. Even though all the test taking will be done electronically but the manual test taking will be allowed under certain conditions such as age barrier.

After the test is ended the answers will be automatically checked and results will be calculated in real time. The candidates can get their results immediately from the counter. This saves the time of waiting for the results to be announced. Thus candidate who failed the test can retake the test on the same day compared to existing procedure where failed candidates have to retake the test on another day. One more feature that's worth mentioning is that the results will be directly inserted into the database. This will prevent the result from being tampered with or error caused by human handling of the results.



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## **1.0 INTRODUCTION**

### **1.1 Project Overview**

This new concept is to allow the convenience of the candidate and the administrator. It is developed using PHP scripting language. PHP scripting language is a server side scripting language. It is also an open source language and fast becoming the favourite of web developer in recent year. It has many advantages over PERL and ASP for medium size system as it is a cross platform development tools.

The system consist of 5 modules; selecting questions, questions and answer, verification, tutorial and checking. For module selecting questions each part consist of a numbers of questions. This question in each part will be randomized separately. This will enhance the randomization of the question. Questions and answer module will navigate the users through all the question and storing their answer. The answer can be checked and change using the index page. The index page will show the unanswered question and answered question. With the index page navigation through the question will be easier with just using the back/next button. Verification will be done before the start of testing.

After all the answer is chosen user can recheck their answer. The chosen answer will be display in each page of the question. After each test is concluded the system will checked it immediately. the result will be display real time for the user and the result will be printed out. Before the test start, there is a tutorial to teach the user how to use the system. The answer will be stored locally in each computer. The Mysql database will be use and install in each computer.



## 1.2 Project Objectives

The JPJ theory test will be reintroduce as an electronic(LAN) test starting from May 2002 onwards gradually. This is to replace the existing method of written test that had been use since the beginning. The online test taking has many advantages over the written method. This is part of the effort by the government to implement its e-services program.

### 1.2.1 Administrator Scope

Currently the test taking Of the JPJ theory test is done using the hand written method. This method will be abolish by the JPJ and be replace with the online method. This method will enable the officer in charge of the test taking to evaluate the candidate result much faster as the answer will be marked in real time environment once the candidate finish the test.

Apart from this, fraud during the test would be impossible since each computer is separated with cubicle's partition. Each set of answer will be entered into the main database. So it would be certain that the result will not be accidentally mixed up.

### 1.2.2 User Scope

Even though after this system had been implemented, user will be given option to take the test manually. But this will only be permitted in certain circumstances. These prerequisite of choosing to take the test manually are such that stated the user must be above certain age level, this is to give those who are computer illiterate and senior citizen to take the test.



## 1.3 Project Scope

In this system there are 5 module involve. These 5 module are divided into 2 main scope; administration scope and user scope. In the administration scope there are Checking module, Selecting Questions module and Verification module. In the user scope there are Tutorial module, and Questions and Answer module. Each scope will have independent implementation from each other.

### 1.3.1 Administrator Scope

An administrator can set the password for each candidate. Before each test begin, each candidate will be issue a pass word and an user name. The administrator can set these password through the Verification module. These password can only be use once every day. These passwords must be keep confidential from other candidates. The questions are a set of about 500 questions. These questions are later divided into 4 sections according to its type. The administrator can print out the result after every session of test. The administrator can query the database to display the results of the candidate. Although the results can be obtain but the correct answer to each question cannot be display out to prevent it from being manipulated.

### 1.3.2 User Scope

User can try to understand how the system work before starting their test. The tutorial will introduce the user how to use the interface. Users can navigate through the questions with the Questions and Answer module. The navigation can go through any questions in the set of randomized questions given to the user. To make the navigation easier, an index page will be display to give the user a better view of the whole question set. Input of answers can be change incase user is not satisfied with the previous choice.

## **1.4 Report Summary**

### **Chapter 1 :Introduction**

This chapter gives the introduction about the project as well as the objectives,scope and the importance of the project deelopement.The development method and scheduling also mention here.

### **Chapter 2:Literature Review**

This chapter review about the existing system and the system that is going to be develop. The advantages of the new system will be stated out and compare to the existing system.The disadvantages of the existing system will be improve in the new system.All the technologies will contribute to a well build and reliable system.

### **Chapter 3 : Methodology**

The method used to gather information concerning the existing system will be briefly discuss.This information is vital to build a much improve system.The metho used to developed this application will be discuss.The security policies concerning the reliability and authentication of the system during the implementation is summarized in this chapter.

### **Chapter 4 : System Analysis**

This chapter describe the functional and non-functional requirements.System requirements are needed to allow developer focus on what kind of system to build.It is the first step in a system development cycle.Tools and techniques that are used will also be describe here.Comparison between the techniques and tools will enable developers to choose the right tools and techniques to benefit the system development progress.



Chapter 5 :System Design

This chapter will describe how the system is transform into a complete and working system.A set of system component and interface will be determine first before real implementation is done.This set of analysis will make the development process easier and minimize the error.



1.5 Project Schedule



Figure 1.0:Gantt Chart for project development

Stage 1 :Project Planning

Stage 2 :Literature Review

Stage 3:System Analysis and Methodology

Stage 4:System Design

Stage 5:Coding Implementation

Stage 6:System Testing

Stage 7:Documentation

## **2.0 LITERATURE REVIEW**

### **2.1 Manual JPJ Test Taking**

The existing JPJ test is conducted manually now. But it will be phased out in A period of 1 year. Now before getting a L license a candidate must sit for the JPJ theory test in any center. First the candidate must registered with the center before taking the test. During the test each row of candidate will be given a different set of questions. This different set of answer is different in the sense of the questions are arrange differently. But all the questions are taken from the master set question. This is to prevent candidate from performing fraud during the test.

The candidate will be given a stipulated time frame to finish the test. After the time is up the answers sheets will be handed up to the officer in charge. The objective answers sheets will then be checked with a computer. The results will be out after about 2 hours. If the candidate passed the theory test they can proceed with the practical test. If they failed they must retake the test on another day. Candidate must register for another test but not on the same day.

Considering these tests are taken and check manually it will have certain difficulty in preventing fraud being carry out by unscrupulous party. Thus a new system and procedure need to be implemented to control the situation from becoming worse.

### 2.1.1 Disadvantage of Existing Procedure

There are a few disadvantages in the existing manual test taking system. These are caused by the steps taken during and after the test. These shortcomings are

- The sets of questions are being used again and again without changing the questions arrangement.
- Each set of questions has the same question only the arrangements are randomized.
- Answers can be memorized according to set of questions.
- Candidates that are given the same set of questions sit in a row and the answers can be seen easily since it is all objectives.
- When the answer sheets are handed up to the officers it can be changed easily with another sheet of answers.
- Failed student cannot retake the test on the same day. This can be really inconvenient to the candidate to come for the test another day.
- Results need to be inserted into database manually and this step can produce human error.
- Results will only be announced after about 2 hours.



## 2.2 Proposed Electronic Test Taking System

The proposed electronic test taking system will enable the authority to tackle the disadvantage and shortcomings of the existing manual test taking procedure. This test will be taken by candidate in the JPJ certified centers. First the candidates must register and pay the test fees. Then each candidate will be given a unique password and an ID to identified the candidate.

The password is unique and no two identical passwords will be given out during each test session. The ID is the computer ID which the candidate will use to take the test. This will prevent problem of mixed up identity between candidates. The candidates will be separated with cubicles as each computer is separated by a cubicle. Once the test started a countdown clock will be tick off. Once the stipulated time is up the test will automatically stop and answers will be checked and results will be calculated. The questions will be randomized thoroughly. Thus the possibility of two sets of questions that have the same arrangement of questions will be very low in fact nearly zero possibility.

The answers will checked instantly after the test stopped. No changing of answers will be allowed after that. The checking will be done with precision. Results will be calculated out. The results will be instantly printed out for the candidates. The result will be inserted into the database without being going through human handling. Results cannot be changed once being calculated. This will ensure human error does not occur. Candidate who failed the test will be allowed to retake the test on the same day.

### 2.2.1 Advantages of Electronic Test Taking System

The electronic test taking system will be implemented to enhance the standard of the JPJ theory test. It is more superior compare to the conventional method of taking the test. These advantages are

- The questions are constantly being changed and the arrangement will be different from each set of questions. This will prevent the candidate from knowing and memorizing the answers only.
- Candidates will be separated by cubicles to ensure no exchange of information between candidates.
- Once the test is stopped the checking will be performed automatically. This step will prevent the changing of answer sheets after the test.
- Results will be printed instantly after being calculated.
- Candidates will be allowed to retake the test on the same day.
- Results will be entered into database automatically. This will avoid error cause by manually entering the data.



## **3.0 METHODOLOGY**

### **3.1 Information Gathering**

A system is a regularly interacting with an independent group of elements forming a unified whole. A system can be defined as a collection of related parts where its components interacts with each others and outside commands. Before developing a system, a lot of information need to be gathered. This information includes the real system information, the proposed procedure, the existing system methodology and procedure, and the methodology used in developing the new system. The information can be gathered from different sources such as system users, computer program (if any), procedure manuals, forms and documents, books and internet.

#### **3.1.2 Computer Program and Procedure**

##### **3.1.1 System User**

System users can be either independent users or an organization which uses the system. This is the main source of information can be gathered from. This is because the system is being developed for the users. Their opinions and necessities is the main objective in developing an acceptable system. The system developed need to be familiar, usable, acceptable and easy to handle for all level of users from novice to professional. Methods used in collecting information from users are through observations of the users activities, behaviours, questionnaires and interview.

The observations can be based on the satisfaction when the users are using the system. Each steps taken when performing a task need to be recorded. This is to



familiarized with the routine when the users are performing a certain task. This will enable the new system developed will not burden the users in a too different environment. Another alternative to get the users natural opinion on the system is through observing their behaviors when using the system. Frustration and ease of use can be easily seen especially when users are loaded with enormous pile of work.

Apart from this we can get direct reaction from users through interviews and questionnaires. The interviewee must be randomly selected among the users regardless of their positions. This is to make sure the results cover all level of users of the system.

### **3.1.2 Computer Program and Procedure Manual**

Next effort is by examining the program written for the existing system (if available). The past developer program of the existing system need to be carefully looked through. The prerequisite of the system can be extract from here. This information will help the developer of the new system to understand the fundamentals of existing program and what to expect in the output of the new system. This context covers the program documentation, data structure and processes involved.

Procedure manuals specified users activities that are important in the details of the system design. Reports indicates the expected outputs from the processing of inputs by users. it states the consequences of each process and inputs. Forms and documents are

useful source of information realated to system data flow and transactions. The most recent documents and forms must be used for reference.

### **3.1.3 Books and Internet**

There are a lot of books to refer to when building an application. These books contained knowledge and experiences from professionals. Boos will give detailed information which is essentials to the application development. These knowledge obtained by the writers through years of experience. Thus it is most useful for reference by developers.

This is the era of bursting information where information gets obsolete fast. The internet is a new source of information for the developers who needs latest and most comprehensive information. Internet can offer any information you wanted and referring to Internet have proven to be an advantage to developers.

## **3.2 Methodology**

### **3.2.1 Waterfall Model with Prototyping**

The process model applied in this project is Waterfall Model with Prototyping which is also know as Incremental Model. This methodology is chosen because of its strength that incorporate the advantages of Waterfall Model and Prototyping Model.

The Waterfall Model is the first explicit model of the software development process. It was deliver from the engineering process model. It offers a mean of making the development process more visible to developers. This is because software development



process tend to cascade from one phase to another. In conclusion it is a systematic sequential approach to software developers to model after a conventional engineering cycle where one phase is completed before another begins.

Prototyping Model is the process of building and modifying a model system in response to users feedback until a complete acceptable system is developed. This prototyping method has its advantages due to the fact that it is straight forward. It involves developing a initial prototype system. Then by gaining experiences and continuing to improve the system through the process until an acceptable solution is found. In addition Prototyping Model is also a worth while technique for quickly gathering specific requirements information. Effective prototyping should come in the early stage of the system development life cycle which is during requirements determination phase.

Through out the JPJ Electronic Test system, Waterfall Model will serve as the main foundation for the whole development. This is because the steps found in the model is very similar to generic steps found in software development process making it suitable for all software engineering paradigms. As mentioned before prototyping is involved in the early stages of the development life cycle where the high level of uncertainties exists. The main focus of prototyping is try to experiment with user interface requirements and usability factors to finally come out with a complete system.



### 3.2.2 Advantages of Waterfall Model with Prototyping

The reason for choosing this model is because this development approach is based on that it provide easy association of each milestones and deliverables since one phase is completed before another phase begin. This will make the development process more visible, deliverable, allow exploration of alternative strategies and approach revision. All this serves as the basic for discussion and to help identify requirements when there is no current system similar to the proposed desired system to refer to.

Changes in the prototype is encourage because it proves that the prototype is evolving into the desired system. This changes can be done in the early stage of the development. The elements that are included in the early prototype model can be review and adjustment to the elements to improve the system's functionality. Early determination of users needs and requirements will benefit the developers to recognize the focus of the system. Misunderstanding between software developers and clients can be identified as the system's functions are demonstrated in the ever evolving prototype model.

Figure 3.0: Waterfall Model with Prototyping

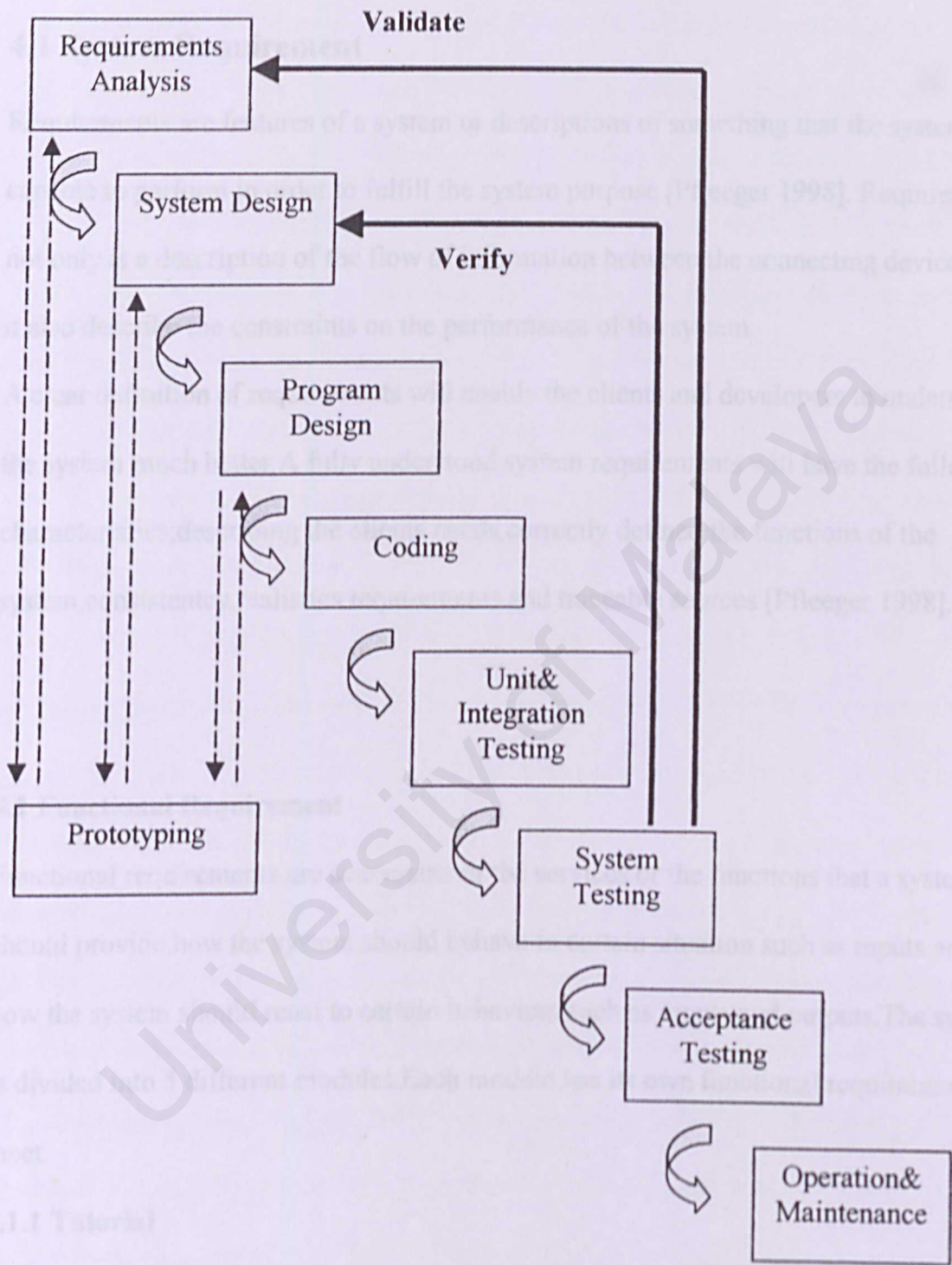


Figure 3.0: Waterfall Model with Prototyping



## **4.0 SYSTEM ANALYSIS**

### **4.1 System Requirement**

Requirements are features of a system or descriptions of something that the system is capable to perform in order to fulfill the system purpose [Pfleeger 1998]. Requirements not only is a description of the flow of information between the connecting devices, but it also describe the constraints on the performance of the system.

A clear definition of requirements will enable the clients and developers to understand the system much better. A fully understood system requirements will have the following characteristics; describing the clients needs, correctly defined the functions of the system, consistency, realistic requirements and traceable sources [Pfleeger 1998].

#### **4.1 Functional Requirement**

Functional requirements are statements of the services or the functions that a system should provide, how the system should behave in certain situation such as inputs and how the system should react to certain behaviors such as inputs and outputs. The system is divided into 5 different modules. Each module has its own functional requirements to meet.

##### **4.1.1 Tutorial**

Candidates can learn how to use the system through a simple yet comprehensive tutorial. This tutorial will provide the users with every step that need to be taken to complete the test. Each button and interactive functions will be describe with explanations. After this tutorial the users will be able to start their test with confidence .



#### **4.1.2 Selecting Questions**

This module will take care of operation of the questions store in database. These operations include storing, randomizing and sorting questions. The questions in the database will be divided into sections according to their type. In a set of randomized question, each section will have a stipulated numbers of questions in it. There will be no same question appear twice in the same set of randomized questions of the same candidate. Random access to any question will be sorted out. Each set of question will be store in a database table. This is for the purpose of checking the final answers from users. The answers can be change if the user is not satisfied with the previous answer.

#### **4.1.2 Questions and Answer**

In this module ,questions will be display according to its position in the set of question. Answers from the users will be sorted in database table. These answers can be change if the user is not satisfied with the previous answer. Input of answers will be just clicking on the button and press send. Users can navigate through the set of questions using navigation buttons or by referring to an index page where all the questions numbers are listed out to indicate unanswered questions. An index page is needed to give the users an overall navigation view of the whole set of question. Answered and unanswered questions numbers will be display in different colours. Users can click on any number button to go to the question directly to answer the question or change the answer. Each page would displayed the answer inputted by users.

### 4.1.3 Checking

After every test ended the answers from users will be checked and results will be displayed stating the percentage the users score. A user can end the test whenever he feels like it. But there will be also a time period a the users must finish the test. The test will end automatically and the answers will be checked when the time is up. The module will also be able to checked answered and unanswered questions. This will be use to display in the index page.

### 4.1.4 Verification

Each user will be given a password and ID before the test start. This ID and password will be needed to enter the online test. The password will be generated randomly. The ID will be the ID of the computer each candidate use. Any given password will be check to avoid any duplicate in the password of different user. The ID and password will be store in database to identify the results of the users in the end of the test. Each administrator would be require to input their ID and password also before every test start.



## **4.2 Non-Functional Requirements**

Non-functional requirements are defined as the constraint on the service or function offered by the final output of the system. A good system should meet the non-functional requirements to ensure a system that will meet the demand of clients. They are as follow.

### **4.2.1 Scalability**

The system should be able to adapt itself to an environment where there are a large number of users connecting the system simultaneously. It should also manage to maintain the quality of services when there are a sudden increase in traffic.

### **4.2.2 Portability**

The system is design to cope with migration of one platform to another in the future. Migration should not cause much hassle to the system administrator.

### **4.2.3 Security**

Security is the top priority in the development of the system. It should prohibit unauthorized users from accessing the system. Crucial information in the system should be protected and not easy to be tamper with.

### **4.2.4 Maintainability**

After a system being implemented, its biggest task is to maintain the system. It will probably cost a huge sum in maintaining the system through out its lifetime. Thus easy maintenance is a must. To build an easy to maintain system, it should be design to such a way that it can be easily understood. If there are future enhancements it should be upgradeable easily. A good documentation will help much to achieve a highly maintainable system.



#### 4.2.5 Reliability

The system must not only perform its functions correctly but must also need to achieve high accuracy and acceptable respond time. It must be robust to cater for improper usage by novice users. A reliable system will have the confidence of the users for further usage.

#### 4.2.6 Modularity

The entire system should not be developed in a packed module. It should be broken into several modules according to its functionality. This is to facilitate system maintenance and testing. With modular design, the system would not face any problem for future enhancements and modifications.

#### 4.2.7 User Friendliness

Consistency is the key word in developing a user friendly system. Consistency should be implemented in the screen design and error handling. This is to avoid ambiguity in the system. There will be different level of users using the system. So it should be able to cope with different level of users from novice users to skilled users. Providing easy to understand commands will greatly help to achieve the target of a user friendly system.

### 4.3 Brief History of Internet

Modern day computer networking emerge in the early 1970's. It all started in 1969 when the U.S Defense Advanced Research Projects Agency (called ARPA or DARPA) commissioned a wide area network of computers called ARPANET. The program was led by Larry Roberts at DARPA. It's initial linkage was just computers at universities and others research institution in U.S and other NATO countries. Back then internetworking technology was still primitive. To interconnect computers between two different organization would mean that a common set of equipment must be used. Thus making it not popular among organizations.

What makes this interconnection possible is the set of communication standard, procedures and format in which involve the devices and facilities of computers. This is called protocols. The two basic protocols that formed the basic for the internet is TCP and IP or the combination called TCP/IP. The detail design of TCP begin when DARPA contracted Cerf's group at Stanford to detail the design of TCP software. Shortly after University College London build an independent implementation of TCP protocol which later it was split to TCP and IP. Packets switching is a better choice because it is far better suited with the typical burst communication style of computers. Computers communicate typically by send out a brief but intense bursts of data, then remain silence for a while before sending out the next burst of data. This behavior is not suited with the conventional circuit switching which has difficulty in delivering digital data without errors.



The TCP/IP protocol is refined and improved over a time of four more years. Finally in 1980 it was adopted as the standard by the U.S Department of Defense. On 1<sup>st</sup> of January 1983, the ARPANET was converted to TCP/IP as its standard host protocol. Gateways were developed by Bolt Beranek and Newman (BBN) to pass packets to and from host computers on “local area network”. Refinements and extension of this protocols and others associated technologies continues to this day by the Internet Engineering Task Force.

#### 4.3.1 How the Internet Works

Internet can be easily define as a network of networks. It is the world largest distributed system and it is designed to be redundant and resilient since it has abundance of routes and it can be easily recover from mishaps. The internet does not belong to a single company or organization let alone a single network. It is a mesh of hundreds of thousands of inter connected networks. No single organization or a single country controls the internet. All the networks are connected to each others through ISPs (Internet Service Providers) about 8000 of them worldwide.

There are a numbers of ways to connect to an ISP; modem dialup, ISDN, DSL, cable modem, wireless, leased lines and more. The transmission rate differ from a few kilo bytes per second to a few Mega bytes per second. Communication on the internet begins with the breaking up of the data such as text or pictures into small packets of data. These small packets of data then will be send to its intended destination through the



internet. But first they have to go to the local ISP. To reach the destination intended, the packets of data will be passed from one ISP to another ISP through an Exchange Point (IX) or National Access Point (NAP) or Local Area Point (LAP). The packets may go through a number of ISPs before it arrives at its destination. The protocol that ties these links together is called TCP/IP.

After getting a query from the packets of data, the web server sends a response back along the similar procedure but not necessarily the same path. This is called routing. Much routing in the internet is dynamic. This means that it happens automatically. There are a lot of reasons that effect the routes taken by the packets such as traffic congestion of paths, failure or connection problem, disruption of service and many more.

Other than the connection, the root name servers are also very important. Name servers will translate the domain names of a web site such as `www.catcha.com` into the IP address such as `185.0.0.112`. This IP address will be used by the internet protocols to carry the packet through the internet and to its destination. First step to translate a domain name is to identify its Top Level Domain (TLD) such as `NET`, `COM`, `ORG`, `EDU`, `GOV` for the kind of organization or TLD for identifying countries such as `MY` (Malaysia), `SG` (Singapore), `JP` (Japan).

The internet's biggest advantage is that it is a decentralized system. It is designed from the beginning into its own protocols and tested in practice over the years. One broken part of the internet does not effect the whole system tremendously. Problems can be solved

with cooperation from all the ISPs around the world. It is the cooperation of many parties that allow the internet technology to grow so rapidly that no such kind of development ever seen in the history. Knowing its basic architecture the internet is no doubt a robust and hard to break system. The internet is still changing as it must evolve to continue to stay relevant.

## 4.4 WEB TECHNOLOGY

### 4.4.1 Server Side Scripting

Server-side scripting (sometimes referred to as server-side includes or SSI) is a way of getting more dynamic information into your HTML. By 'dynamic information', it means information that can change every time your page is looked at. A good example of this is something like a counter, showing the number of people who have accessed the web page, or the current time and date.

Through the magic of server-side scripting, we can:

- automatically insert information such as the date a file was last modified
- insert the contents of another HTML file
- use one HTML document to produce two or more web pages
- create feedback forms that allow you to get email directly from the web
- access and modify online databases



The clue to how server-side includes work is in the name. When someone clicks a link on a web page or enters a URL into a browser(Netscape), they are requesting a document from a web server. The web server is called a 'server', because it 'serves' the web page, and the browser is called a client, because it is asking for service.

When the client types in the URL: `http://www.catcha.com/web/authors/index.html`, a number of things have to happen before the client can get the page:

1. the machine `www.catcha.com` is located on the network
2. if the machine is found, it is asked for the file `index.html`, which is in the `web/authors` directory (if it can't be found, you get the dreaded 404 error)
3. if the file is found, the web server sends it to the client

In this process, a system administrator can get the web server to 'parse' the HTML file before it is sent to the client. For example, you can get the server to look at the HTML for a line like:

```
<!--#echo var="LAST_MODIFIED"-->
```

This line is a code which the web server understands like a language. In this example, it directs the web server to 'echo' (which means, to display) the value of something called 'LAST\_MODIFIED', which happens to translate to the date the HTML file was last modified. In other words, we have inserted some scripting which says "display the time that this HTML document was last modified".

This whole construction collapses to a date when it is parsed and before it is sent off to the client. So, before it is sent (say, when we load it into an editor) the HTML source looks something like:



Date last modified: <!--#echo var="LAST\_MODIFIED"--><BR>

But, when the client gets the document, the HTML source has changed:

Date last modified: Mon, 15-Sept-1997<BR>

The great thing about this is that the client has no idea that you've used server-side scripting. By the time the client gets the document, it has been parsed and there's no sign of scripting in the document at all.

Six prominent scripting tools are ASP, Perl, PHP, Python, Tcl, and Java servlets.

#### 4.4.1.1 Comparison of PHP and ASP

##### Speed

ASP will probably never be as fast as PHP. ASP is built on a COM-based architecture. When an ASP programmer uses VBScript, he is running a COM object. When he writes to the client, he's calling the Response COM object's Write method. When he accesses a database, he uses another COM object to do so. When he accesses the file system, another COM object is called. All this COM overhead adds up and slows things down.

In PHP modules, everything runs in PHP's memory space. This means that PHP code will run faster because there is no overhead of communicating with different COM objects in different processes. The following benchmark, where we execute a Select statement 40 times on Microsoft SQL Server 7 using PHP's MSSQL7 extension or PHP's ODBC extension and COM.

Table 4.0: Queries-respond times

PHP Querying MSSQL7	Seconds (lower is better)
Using MSSQL extension	01.88
Using ODBC extension	09.54
Using ODBC via COM (ADO)	17.28
Using OLEDB via COM	06.19

When we access the database using PHP's ODBC extension, it's 9.54 secs. Using the COM interface to connect to ODBC adds a 80% overhead (17.28 secs) to ODBC. OLEDB is Microsoft's high speed COM technology for accessing databases. It is faster than ODBC, but when we use the PHP MSSQL extension we get a 200% increase in performance.

**Superior Memory Management**

In ASP's model (in IIS 4), if an ASP file *header.asp* is included into 20 web pages, then 20 compiled copies of that *header.asp* are maintained in memory. IIS 5 has implemented an improved memory management model, but only programmers who are using Windows 2000 can upgrade because it is not backward compatible with IIS 4, and Windows NT 4.0 cannot run IIS 5. This means that most IIS web servers are still stuck with the inferior memory management model.

This is unlike PHP, which only loads include files that are required.

**Cross Platform Migration Strategy.**

Microsoft is constantly tuning ASP. The next generation, called ASP+ is being previewed now. There is no doubt that they are fixing some of the criticisms that's



currently being discussed. But there is also no doubt that Microsoft aims to lock users down to use their products.

When a programmer switch from Macintosh to Windows, most of the code was never ported over. So having a backup is unavoidable. It's called PHP. Programmer can still program on Windows, but they know their PHP program will run on Solaris, Linux and many other operating systems because it is a cross-platform development environment.

#### 4.4.1.2 Comparison of PHP and Cold Fusion

##### **Platform Support**

CF has a relatively limited platform selection. Windows, Solaris, Linux or HP/UX. (Note, initial feedback shows that the Linux version may outperform the Windows version by as much as 150%). PHP, if you can compile it, it will run.

##### **Language**

CF is built for display code. Its scripting language is primitive and does not support standard operator syntax or user-defined functions. But, it's really fast and easy for display pages and database interaction. PHP is built to write applications. The language is strong and very flexible. Not as easy for the easy stuff, but much easier for the hard stuff.

##### **Database Support:**

CF abstracts database connections, making them simple to use, and very easy to change DB platform with no code changes. (With CF we can easily develop on one database, and deploy on another.) Native DB support is only available in the Enterprise product,



and limited to just a few large products. Primary DB support is through ODBC, which is fine with Windows, but is troublesome with other platforms. PHP has extremely strong native DB support. Different DBs have different command syntax, making mid-stream database changes painful. A bit more complex to retrieve results.

#### **File-System Support and Regular Expression**

CF has adequate file support, but is quirky and not feature-rich. PHP has comprehensive file system support. CF has a basic RegEx capability. PHP is on par with PERL for Regex.

#### **4.4.1.3 Comparison of PHP and PERL**

##### **Learning curve**

PHP is very easy to learn because the core language of PHP is quite small, and the constructs are similar to Javascript. As a bonus, many basic HTTP concepts are built into the language. For example, HTTP, POST and GET variables can be treated as global variables, which seems quite natural to beginners. People who are familiar with Javascript will have no problems learning PHP.

It has been said that Perl is easy to learn. That may be true, but the Perl style of programming is unique, and quite unlike Javascript. Accessing POST and GET variables in Perl also requires either detailed knowledge of either HTTP header formats or one of many Perl CGI libraries.

#### 4.4.1.4 Server Side Scripting Survey and Summary

PHP is Open Source software, which is great as it means that code, manual, updates and support are all free. But how popular is PHP? How fast is its growth rate? No one is really sure, but it is important because PHP is still immature and a high growth rate will encourage more and more people to contribute and enlarge the community.

To survey the popularity of PHP, measurement of PHP usage using the number of domains and IP addresses that have PHP installed by searching through the World Wide Web with search engine such as AltaVista. For PHP, combination of the url:php, url:phtml and url:php3 numbers are used.

Even though the effectiveness and upper hand of this open source software compare to others of it's same class are undeniable, but the lack of high profile sites using PHP makes it a bit harder to prove it's robustness and gain acceptance from non-programming colleagues (e.g. management), but for a programmer the portability and stability of PHP is beneficial.

#### 4.4.1.5 Conclusion

Considering PHP's functionality and tested capability, it is chosen as the server side scripting language. This is to enable the development's efficiency and a reliable final product.



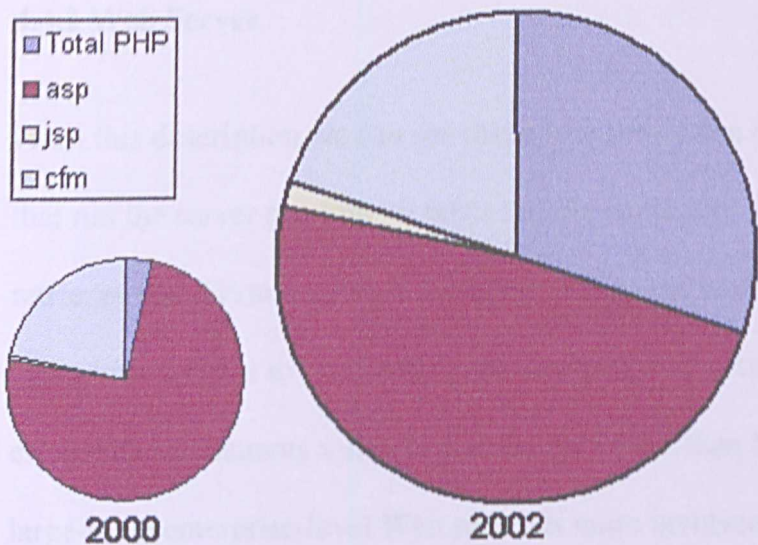


Figure 4.0:Breakdown of server side languages usage in 2000 and 2002

Table 4.1:Total share of server side languages usage in 2000 and 2002

	October 12, 2000	March 4, 2002	Growth	Share
PHP	157,470	7,549,230	4694%	30%
asp	3,166,710	11,958,185	278%	48%
jsp	24,435	413,827	1594%	2%
cfm	936,223	4,950,133	429%	20%



### 4.4.2 Web Server

From this description we can see that a web server can be a simple piece of software that runs on the server machine. It takes the file name sent in with the GET command, retrieves that file and sends it down the wire to the browser. Even if all of the code is taken into account to handle the ports and port connections, a C program can be easily created to implement a simple web server in less than 500 lines of code. Obviously, a large-scale enterprise-level Web server is more involved, but the basics are very simple.

Most servers add some level of security to the serving process. For example a password-protected page that had the browser pop up a dialog box asking for your name and password. The server lets the owner of the page maintain a list of names and passwords for those people who are allowed to access the page; the server lets only those people who know the proper password to see the page. More advanced servers add further security to allow an encrypted connection between server and browser, so that sensitive information like credit card numbers can be sent on the Internet.

That's really all there is to a Web server that delivers standard "static" pages. "Static" pages are those that do not change unless the creator edits the page. In the case of "dynamic" web pages, the web server is not simply "looking up a file." It is actually processing information and generating a page based on the specifics of the query. In almost all cases, the Web server is using something called CGI scripts to accomplish this feature.

#### 4.4.2.1 Comparison of Apache and Microsoft IIS

##### Security

When it comes to security, IIS does not come close to Apache. Apache's security track record is excellent, while IIS has taken hit after security hit. It's estimated that IIS holds 25 percent of the market for enterprise web servers; however, more than half of all defaced websites listed on [attrition.org](http://attrition.org) run IIS. Apache servers only accounted for 29 per of all defacements, despite the fact that it is the most widely deployed server.

One potential downside for organizations that wish to move to Apache from IIS is the Apache unfriendly administration interface: All configuration and administration is done by editing .conf files, although Version 2.0 has greatly streamlined configuration directives.

This downside may actually be a blessed feature for some. Many experts advise disabling administration interfaces, especially Web-based ones, because they are a potential attack point for hackers. Those who want a browser-based management interface despite the security risks can find it in Apache implementations from outside commercial vendors such as IBM.

The last serious security hole in the Apache webserver was reported and fixed in January 1997. Since then the only Apache security holes have been related denial of service (DoS) and unauthorized listing of filenames.



## **Maintenance of the Web Server**

Users of Microsoft's Internet Information Server (IIS) find that keeping up with the near-weekly security patches is just about a full time job. Some compare their efforts at securing Microsoft's webserver to plugging the holes in a vegetable colander.

Maintaining IIS servers is a cumbersome, tedious process. Any time a new server is brought online, you have to apply 40 or 50 patches.

IIS webmasters frequently resort to purchasing and installing after-market devices that harden IIS boxes. Keeping up with the security holes is just too costly. The manpower costs of dealing with the flood of security problems that have plagued Microsoft's webserver can cripple an IS department or an entire small business. Microsoft has issued 21 security bulletins for IIS 5.0 alone and at the rate of about one every three weeks.

## **Web Server Prerequisites**

A major difference between Apache and IIS is their prerequisites. While Apache is available for many Unix versions, Linux, Windows and OS/2, IIS can run only in the Windows environment. The latest version of IIS will run only on Windows 2000 server.



Table 4.2:Prerequisite dependency of Apache and IIS

Feature	Apache	IIS
OS dependency	Unix, Linux, Windows, OS/2	Windows
Hardware platform	Wide range of hardware supported by the different operating systems, including Intel and SPARC.	Those supported by Windows.

4.4.2.2 Web Server Survey and Summary

The Netcraft Web Server Survey is a survey of Web Server software usage on the Internet. Netcraft received responses to its June 2002 survey from 38,807,788 sites. This is an increase from May's 37,574,105 and is not only the first increase since February, but also exceed February's peak of 38,444,856.

Apache, Microsoft, Zeus, and iPlanet remained the key players with shares of 59.67 percent, 28.96 percent, 2.06 percent, and 1.77 percent, respectively. The number of servers decreased across the board for all of the key players.NT-specific servers accounted for 29.20 percent of responses, a decline from the previous month's 31.94 percent. Apache-specific servers accounted for now 61.18, and increase from May's 57.75 percent. Macintosh-specific servers decreased to 1.02 from 1.06 in May.

4.4.2.3 Conclusion

Apache is trusted and with well recognize security features.Considering this is a system with high security requirement of online test taking,it suits the project specification perfectly.Thus it is chosen as the web server for the development of this project.

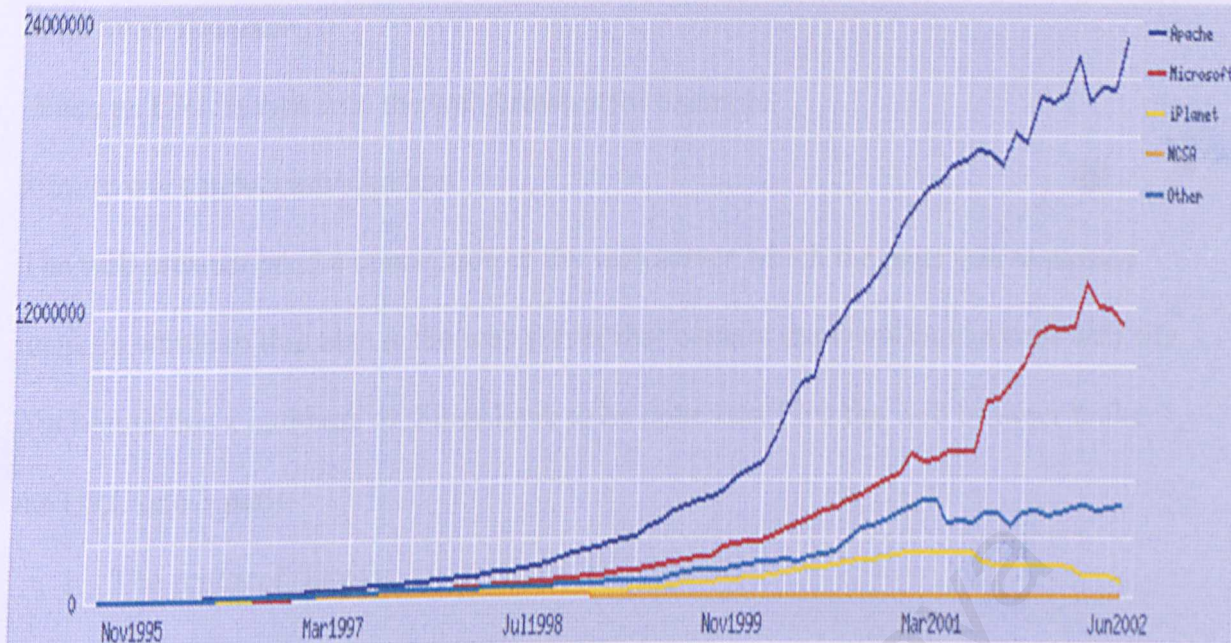


Figure 4.1: Totals of top web servers across all domains

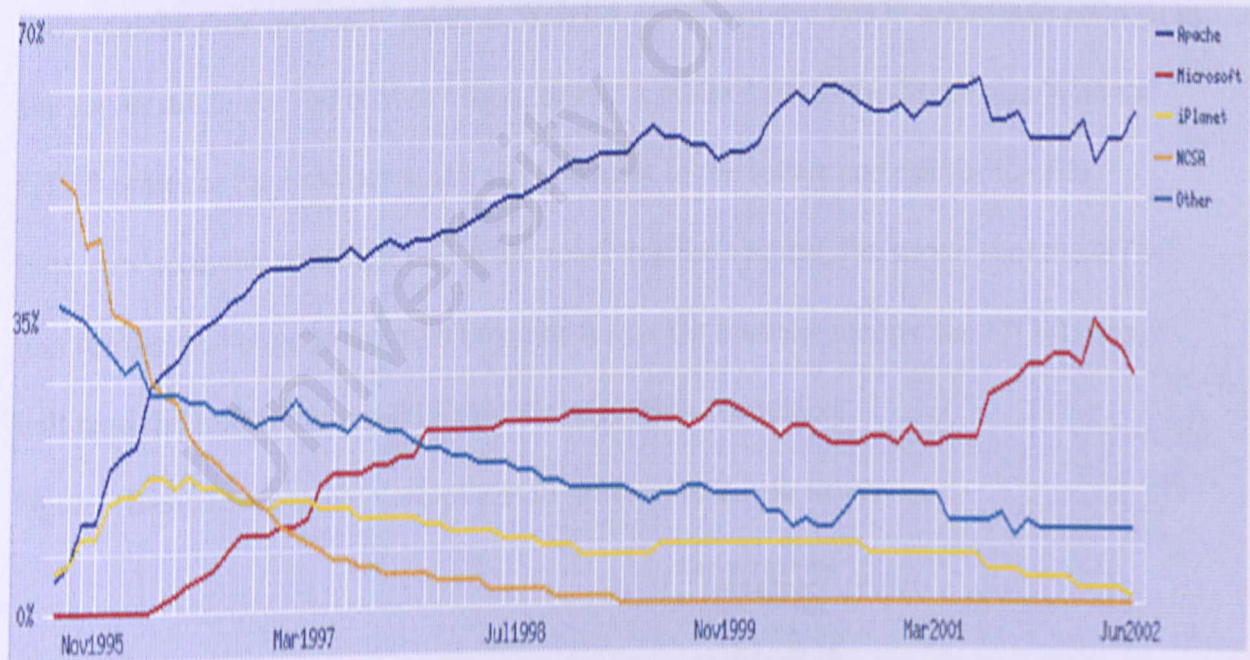


Figure 4.2: Percentage of top web servers across all domains



### 4.4.3 Web Browser

When an URL is type into the web browser;for example

`http://www.catcha.com/sign.htm`

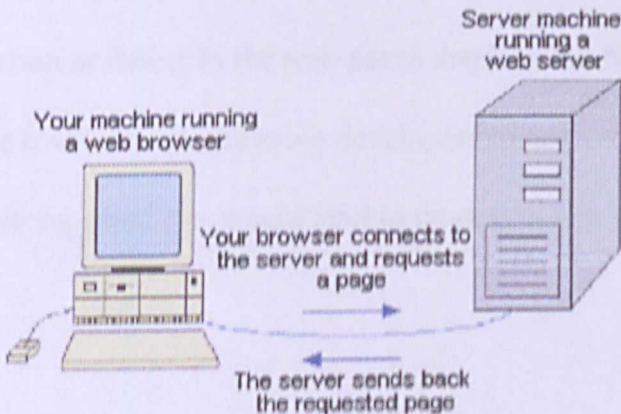
The web browser send a connection to the web server which the page you requested resite;in which in this case is the web server that contain the `www.catcha.com` web site.

But before this a numbers of things have to be done first.First the web browser brake the URL into 3 parts

1. The protocol (`http`)
2. The server name (`www.catcha.com`)
3. The file name (`sign.htm`)

Then the browser will communicate with a name server to translate the URL `www.catcha.com` into an IP address.Web browsers will use this IP address to connect to the server machine.The browser then formed a connection to the IP address.With the HTTP protocol the browser sent a GET request to the server and ask for the file `http://www.catcha.com/sign.htm`.After receiving the request, the server sent the HTML text for the web page to the web browser.When the browser receive the HTML text,it will read the HTML tags and format the page onto the screen.

Figure :Basic level connection of a web browser to a web server



#### 4.4.3.1 Comparison of Internet Explorer and Netscape

##### **Surfing Speed**

Speed is the main aspect in concern for the users in choosing a web browser. A fast connection to any pages you wanted is the main attraction a user chose to use a web browser. Any particular page nowadays is a mix of text, graphics and interactive elements all jumble up in a web page. Clearly Microsoft knew about this and moved their effort to the right direction. This is clearly seen in their latest release of Internet Explorer 6 web browser. It is a tremendous improvement in speed since upgrading from Internet Explorer 5.5. An authoritative source test reveal that IE 6 is much faster in the Mix text and Graphic test.

##### **Better Compatibility**

This is a controversial allegation in which is definitely the case more often than not if not entirely true. Recent statistics show that there are only about less than 10% of web surfers are still using Netscape web browser. Every web browser has its own way of displaying a web page. In another word, a web page may look different in different web browser. Given the numbers showed in statistic, developers are increasingly not bothering to check their web pages whether it is compatible with Netscape. This may result in distortion or defect in the web pages displayed in Netscape. The decline in Netscape users lead to more and more developers to neglect how their web page would look like in Netscape, and this would lead to more problem with Netscape users.



### **Reliability and Consistency**

Internet Explorer 6 offers more stability and error free browsing experience than Netscape. In average IE 6 breaks down twice every month compare to Netscape 6 that breaks down almost every single day.

#### **4.4.3.2 Web Browser Survey and Summary**

Internet Explorer seems to put more emphasize on the true web performance in the real world of web sites. This can be seen from its recent release of IE 6. From the test done, we can see that the performance of IE 6 is far ahead of Netscape 6 in the mixed text and graphics loading test. Nowadays web pages not only contain plain text. It contains a mixed of graphics and text. This enhancement by Microsoft really hit the nail on its head. The test result even surpass its predecessor IE 5.5 far ahead. Netscape 6 could not even match the performance of IE 5.5 in the test. Even though the others test such as loading nested table and loading cache pages are lower than IE 5.5 but it is still well ahead of Netscape 6. One of the main reasons why IE is well ahead of Netscape in its performance is because starting from Windows 98, Internet Explorer became the default web browser in the Operating system. In another word, Internet Explorer became a permanent part of the operating system. This will enable the web browser respond much faster from Netscape which is just a plug in software and not a part of the operating system.

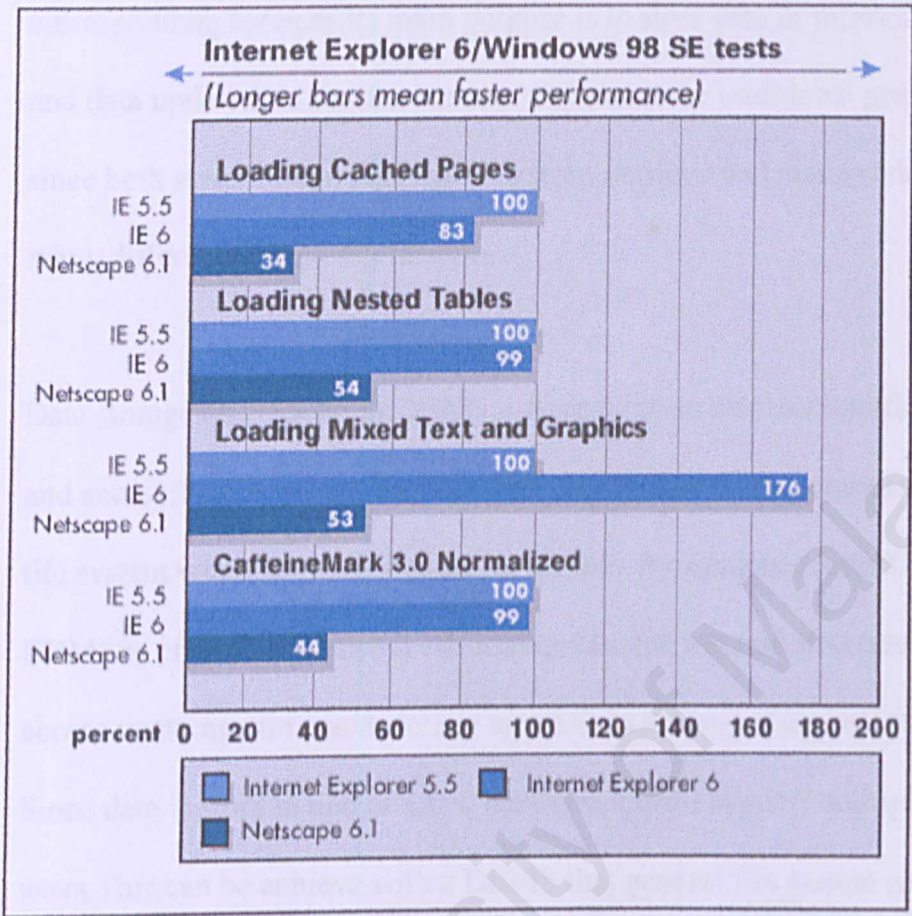


Figure 4.3:Internet Explorer 5.5&6 and Netscape 6 Performance Comparison

4.4.3.3 Conclusion

Internet Explorer is a good choice for this project development.It will not only cater for the majority of users platform but also an improvement in security from its previous version.



#### 4.4.4 Database Management System (DBMS)

Database management systems are used to store data efficiently and provide users with corresponding services. Its main purpose is to store data or information, data retrieval and data update. It is similar in many ways with the traditional general files systems since both system main purpose is to store, retrieve and manage data. But there are also many differences between the two.

Data storage abstraction in DBMS is to provide an abstract interface for data storage and access. This is easier for users to access and store data compare to the traditional file system which depend entirely on indexes for random access. Data storage with DBMS is efficient because it can manipulate the internal structure to provide better access or storage time and storage space. Data sharing is important to an organization. Since data is store in one or a few database, it must support multiple concurrent users. This can be achieve with a DBMS that general file system cannot possibly do. It not only support concurrent users but also provide integrity and consistency in transaction. Time can be shorten in developing a database system with DBMS since all the functions that are needed in data manipulation such as storage, query, concurrency and integrity and management are taken care of by the DBMS.

DBMS is a 7 layers structure system. The layers include the security management to ensure the data integrity. To handle the data, a session and transaction management is responsible. The main operation a DBMS must handle is queries. It handle queries with query optimization and execution. Data manipulation such as add, delete and select

operations need to be control by relational operators on data. Files and access methods declare the way how data can be reach and change. DBMS also has a buffer management to control the data to achieve optimization. Lastly disk space management controls the physical storage space.

DBMS exist in 3 types ,relational,object-oriented and hybrid.The focus will be on relational DBMS.A relational DBMS advantages include a simple representation of the data store and its association of data.Accessing a RDBMS could not be easier with the associative queries.The users only need to specify what data is wanted and the RDBMS will finds out where and how to access the data.

Structure Query Language(SQL) is used to interface with a relational DBMS.In SQL there are 2 sub languages;Data Defination Language(DDL) and Data Manipulation Language(DML).DDL is used to define schemes,relations and domains of a database.DML is used to perform manipulation on data such as performing data queries,insertions,updates and deletions.

DBMS essentials for a complex data management of any organization.This is because of its undeniable advantages.The advantages include redundancy control over data.Although it minimize redundancy but it does not guarantee redundancy from occurring.Data is protected under a save environment from failure.This is important as the integrity and security of data cannot be compromise in an era of bursting information.Concurrency access and data sharing is made possible and trustable



through DBMS. With the usage of DBMS, developer need not be worried by the compatibility of the physical database with the application used to manage it as the DBMS uses the separation of application and database methodology. A change in either the DBMS or the database will not effect the other as it is completely independent of each other.

#### **4.4.4.1 Comparison of MySQL and PostgreSQL**

MySQL has been a choice of the web developer for their web application around the world for some time now. This is due to its attributes that suit well with the requirements of a database driven web site. If performance is the main issue like developing a web based driven database MySQL is the first choice since it was design to work well with web based servers. In contrast PostgreSQL offers overall traditional database application that needs more complex additional functions.

First attribute is that MySQL is very fast in conducting the SQL SELECT statements. MySQL is designed especially for speed because it's engine is really small and stream-line. The default table is design to make fast SELECT functions. MySQL is a great choice for web application that the content is relatively static but have to have the advantages of a relational data structure. This is like a web content with catalogue product and images. PostgreSQL is a stable choice if transaction and foreign keys are needed.

Apart from that ,MySQL is also very stable.The processing queries of the production and serving environments is guaranteed to match the other more sophisticated database system of the much expensive and establish company.Undeniably PostgreSQL does have more additional features but this in turn degrade the performance.Even though it allows creation of complex SQL commands but it is not needed in the test taking project since all it would most probably do is basic operation such as insert result,delete,and updating.

One of the major advantage of MySQL is that the learning curves is relatively shallow.The web application developed with it does not need the advance features found in others large and expensive RDBMS.A new comer to the relational database will be able to learn and create a sophisticated web application in no time.

#### **4.4.4.2 Conclusion**

MySQL is chosen as it is a very fast and reliable relational database.The most important is it is open source software and free of any charges.As the online test will be displaying only the questions and it is quite static,so it's speed to SELECT is an advantage to the system performance.Apart from that the database design will be much simpler.



#### 4.4.5 HTML Editing Tool

Using a HTML editor is similar as using a normal text editor. There are a numbers of HTML editors available in the market all of which have their own advantages and disadvantages. The main purpose of a HTML editor is to make online editing process easier and faster. Since using A HTML editor is just like a contemporary text editor, so learning and using it is just a simple process. With a HTML editor developer with no HTML knowledge or a have no programming background can develop a web page just like a professional. Thus a web page developer need not be an expert in HTML or need to learn any complex application.

Even though it is text based but a HTML editor is more advance then any other ordinary text editor as they are not especially design to develop web pages. A HTML editor has many sophisticated functions. Multi column text layout and sophisticated table can be added in with ease to any design. Web page that is design can be viewed instantly and this gives the developer to have more control over their web pages. Editing a numbers of web pages is not an easy task with ordinary text editors. But with HTML editors editing multiple files could not be any easier because of the global replace function which can edit any numbers of files at the same time and knowing that the files were edited with precision.

#### 4.4.5.1 Microsoft FrontPage

Microsoft FrontPage is a part of the Microsoft Office package. This is also the reason of the why developer anticipate to use this HTML editing tool. It runs on Windows 95/98/NT and 2000 operating system. This is one of the simplest and most common editing tools for web development available in the market now. As an integration to the Microsoft Office package, it interacts easily with the others Office tools such as Words, Excel, Access and Power Point.

It is aimed at letting non programmer build web page fast and easy. FrontPage is easy to learn and easy to use. As it is a part of Microsoft application, users can easily become familiar with the tool and it's user friendly interface. It has additional build in tools to facilitates creation of table, frame, form, banner, Java applets and more. One of the functions that prove much use to a web site developer is that it can finds slow or unlinked files or pages and broken hyperlinks easily. Front Page supports a multi language environment where it is available in many languages so that users can see the FrontPage in their language of choice.

#### 4.4.5.2 Macromedia Dreamweaver

Dreamweaver is a WYSIWYG (What You See Is What You Get) HTML editing tool. The text and images are displayed exactly on the computer screen as it is printed in output. It gives developer the productivity of a visual web page layout tool, control of the HTML text editor. Developer uses Dreamweaver to create visual web page with confidence that the HTML being generated is concise and editable.



Dreamweaver includes advance features of the web such as dynamic HTML and Cascading Style Sheets. It ensures the web page created is compatible with as many platforms as possible and work well with a variety of web browsers. Apart from this Dreamweaver also supports exclusive file locking facility. File Transfer Protocol (FTP) is incorporated within the application. For the same development or project a few developer can work simultaneously and integrate the work later without any problem. The most attractive function available in Dreamweaver is that it has an integrated site management tool to facilitate the developer or the web maintenance in the future.

Other features such as the ease of integration with ActiveX components, Java applets and other plug ins for improving the interactivity of the web site. The final output can be easily associated with other Macromedia applications such as Flash, Shockwave and Fireworks which is essential for an interactive web page.

#### **4.4.5.3 Conclusion**

Macromedia Dreamweaver is chosen as the HTML editor as it is proven to be a easy to use and simple editor. It's added features prove to be useful in developing the web page for this project. Further more there are a numbers of problem with Microsoft FrontPage that make it to have a disadvantage over Dreamweaver. FrontPage can only be supported by two Microsoft FrontPage servers. Database problem also had been know to exist over the FrontPage. Thus Dreamweaver become more suitable as a choice for the development.

## 4.5 System Requirement

### 4.5.1 Server Computer Hardware

- PC with Pentium III (1.0GHz)
- 128 MB RAM
- 40 MB Hard Disk
- 15" SVGA Monitor
- Peripheral ;mouse,keyboard,CD ROM, Floppy Disk Drive
- Compatible Network Card

### 4.5.2 Client Computer Hardware

- PC with Pentium II (333 MHZ)
- 64 MB RAM
- 5 MB Hard Disk
- 15" SVGA Monitor
- Peripheral ;mouse,keyboard
- Compatible Network Card



## **SYSTEM DESIGN**

### **5.1 System Architecture**

The type of architecture used in the development of this system is client-server architecture. This client-server architecture is a versatile ,message based and modular in infrastructure requirement that is intended to improve usability, flexibility, interoperability and scalability. Usability is the ease with which users can learn to operate, prepare inputs and interpret output of a system.

Flexibility is the ease of a system or component to be modified for use in application or environment other than what it was design for. Interoperability is the ability of two or more system or component to exchange information and use the information exchanged for the application. Scalability is the ease of a system or component to be modified to fit the problem area. A client is defined as a requester of service and a server is defined as the provider of services. A single machine can be a server or a client.

#### **5.1.1 Client-Server Architecture**

As a result of limitation of file sharing architecture, client-server architecture emerge. It introduce a database server to replace the file server. A relational database management system (RDBMS) is used to answer directly to a user's query. Network traffic is reduced by providing a query respond rather than a total file tranfer. Multi users updating environment is improved through a graphic user interface (GUI) front end to connect to a shared database. In a client-server architecture, Standard Query Language (SQL) is used to communicate between client and server. One type of simple client-server implementation is two tier client-server.

### 5.1.2 Two Tier Client-Server

Two tier client-server is a simple implementation of a client server architecture. Its design is intended to improve usability by supporting form based and user friendly interface. It can accommodate up to 100 users concurrently (compare to a file server only 12 users). Thus improving the system scalability. The flexibility also improved by allowing data to be shared within a homogeneous environment. Two tier architecture is often used in non-complex, non-time crucial information processing system because it only require minimum operator intervention.

The database management services is usually located in a server machine that is more powerful than a client machine. The user interface in return is being located in client machine environment. Processing management is split between the user interface system and the database management server environment. The Fat Client model is chosen. This model will enable the client side software application to handle the logic application and interacts with the users. Meanwhile the server will only be responsible to manage the data such as updating, deleting, selecting and others data manipulation. The role of a database management system is to stored procedure and triggers operation function in the database.

The two tier architecture is a good solution for a distributed computing environment. The optimum users range is between 12 to 100 interacting on a LAN simultaneously. But it has limitation too where when the users exceed 100 the



performance will drop. This is because the server operates by maintaining a connection via 'keep alive' even no work is being conducted through the line.

The architecture is divided into 3 layers. User System Interface in which such as text input, dialog, and display management services. Second layer is Processing Management that is responsible for process development, process enactment, monitoring and process resource services. Lastly the Database Management is to handle the data and file services.

Two tier architecture allocates the users interface system exclusively to the clients meanwhile placing database management in the server. Two layers are created by splitting the process management between the client and server.

Figure 5.1 Fat Client Model

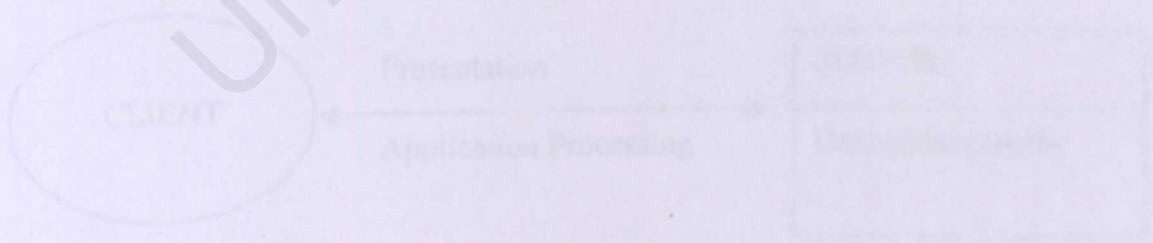


Figure 5.0: Two-Tier Client Server Architecture

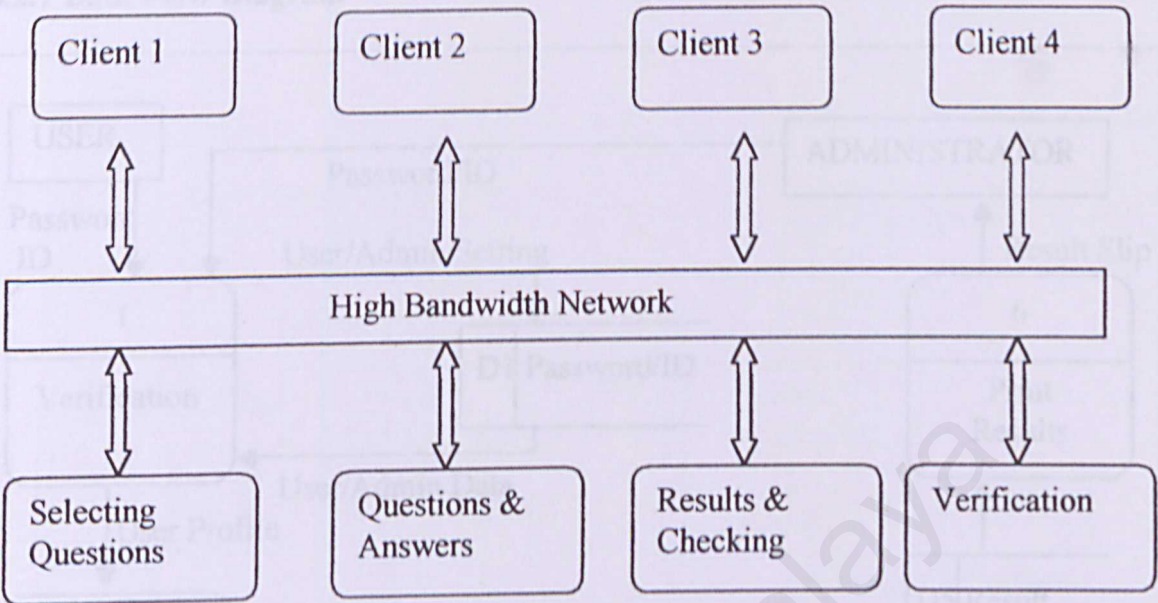
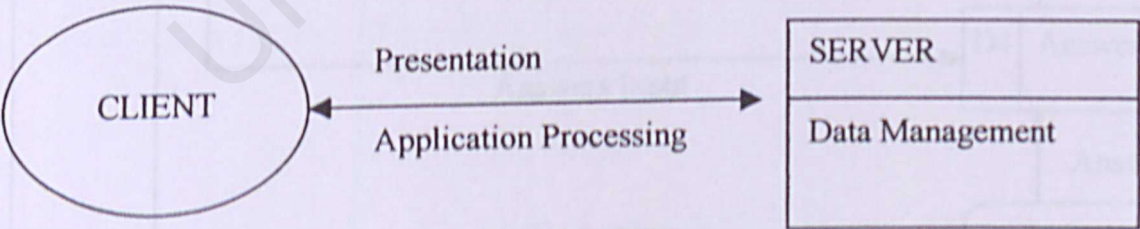


Figure 5.1:Fat Client Model





5.2 Process Design

5.2.1 Data Flow Diagram

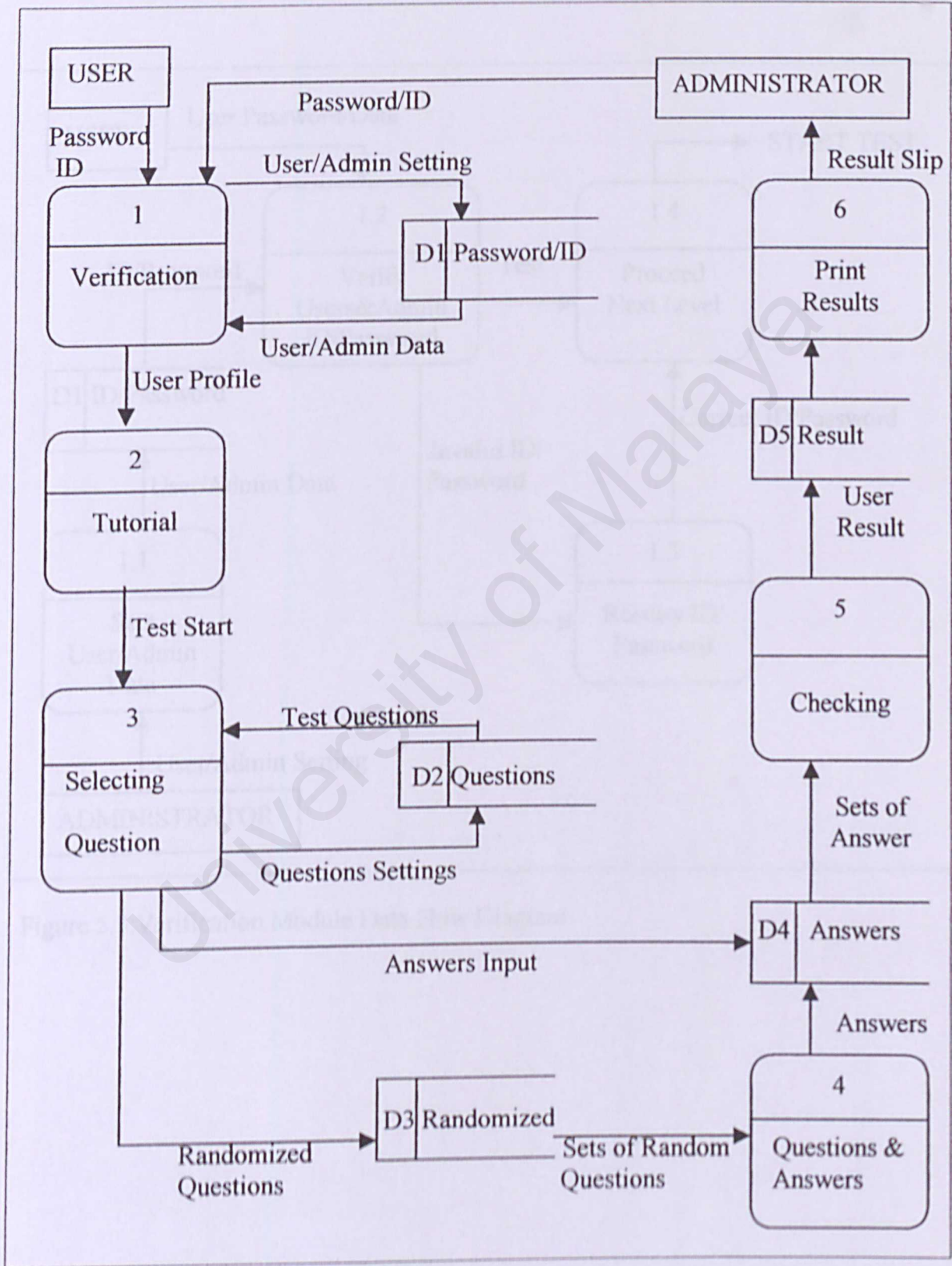


Figure :Data Flow Diagram of JPJ Test Taking System

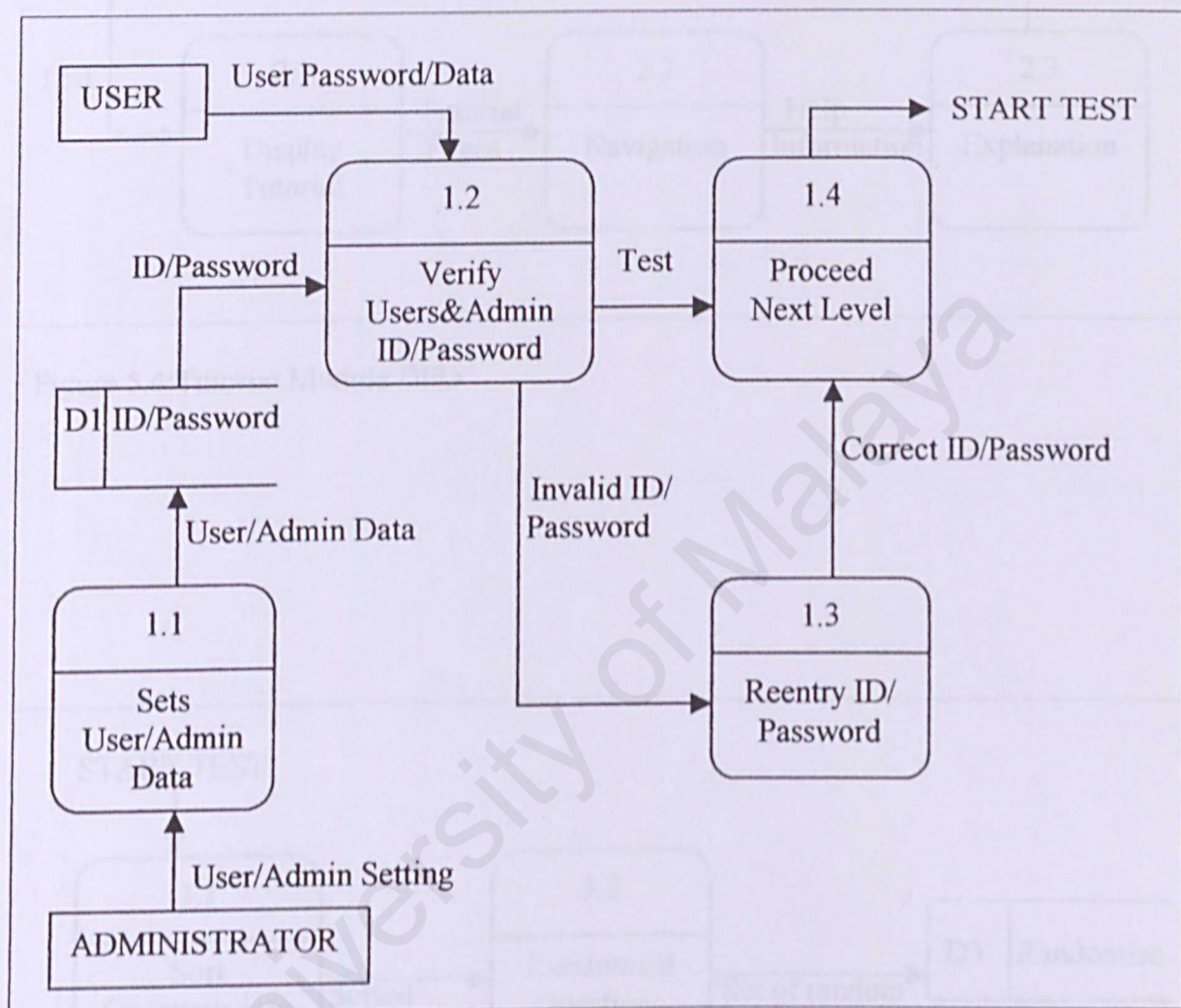


Figure 5.3:Verification Module Data Flow Diagram



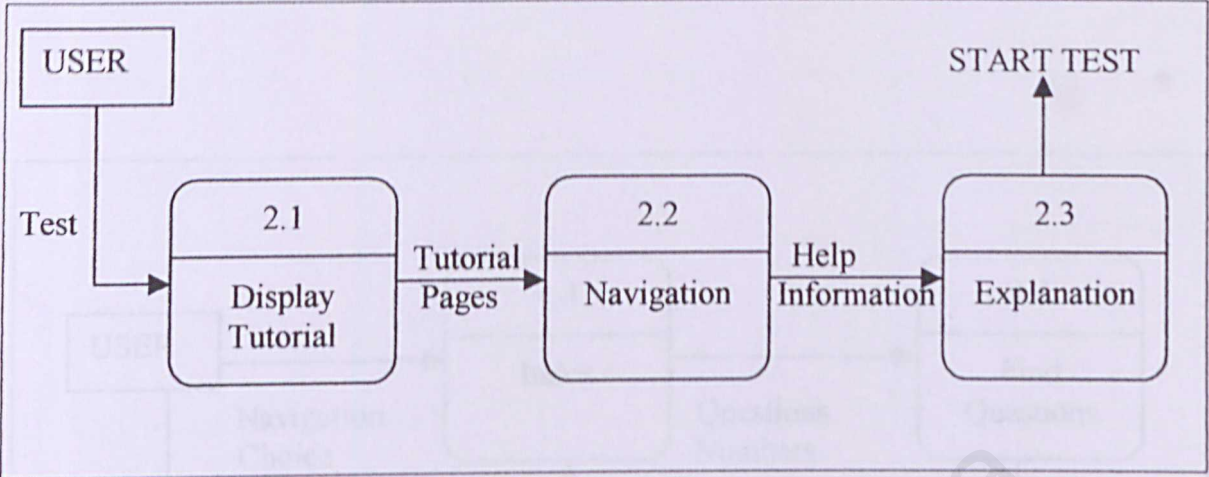


Figure 5.4:Tutorial Module DFD

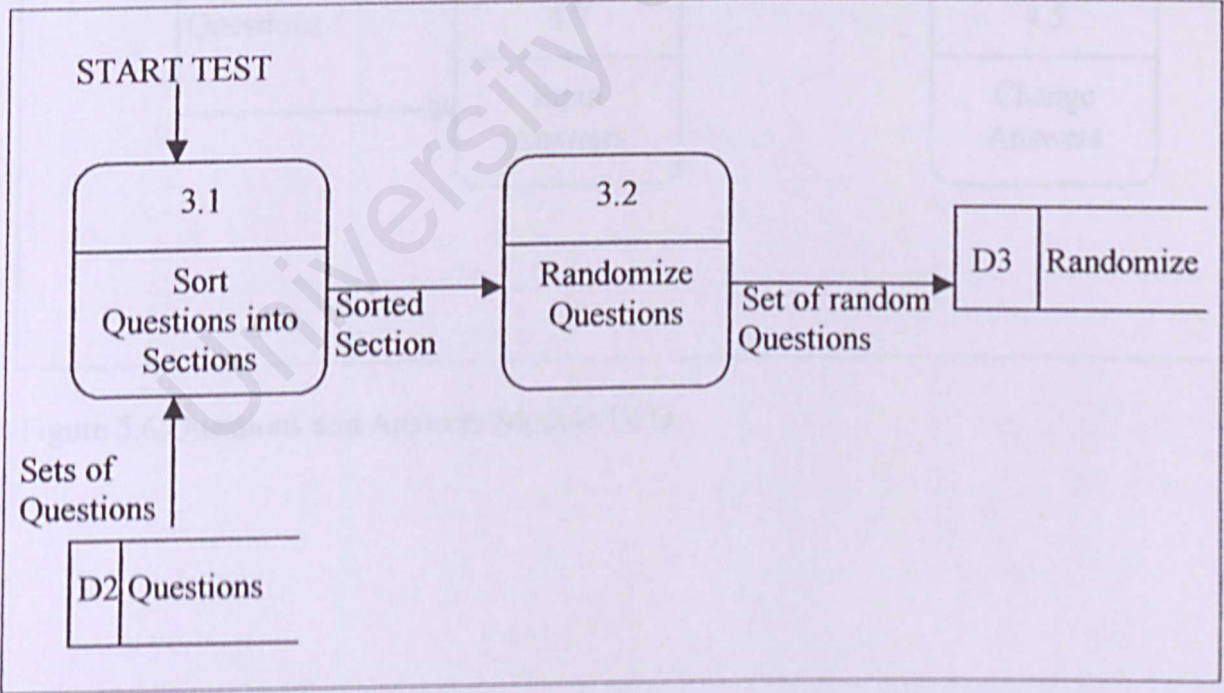


Figure 5.5:Selecting Questions Module DFD

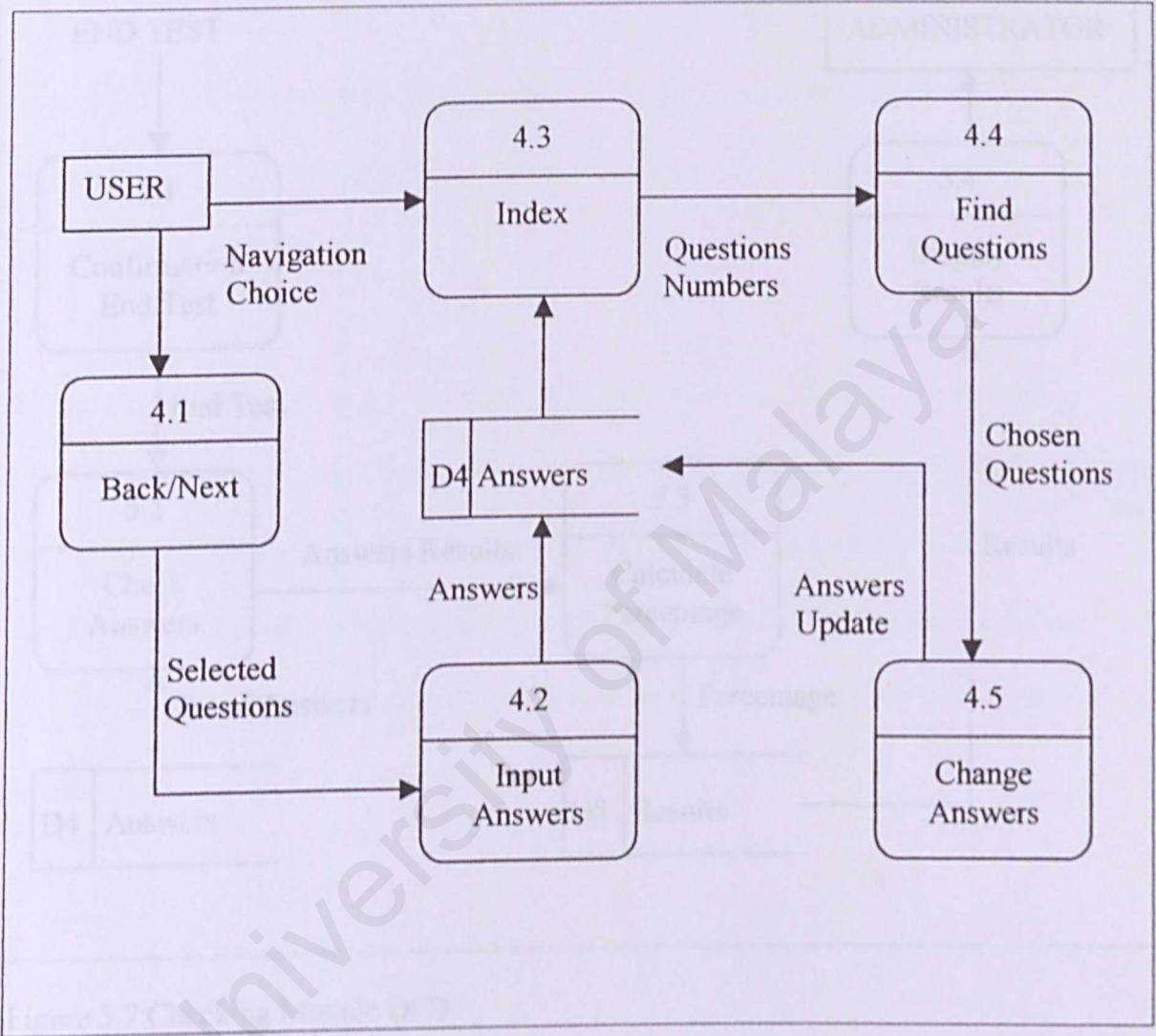


Figure 5.6:Questions and Answers Module DFD



3.3 Database Design

A database is not merely a collection of data or files instead it is a central source of data

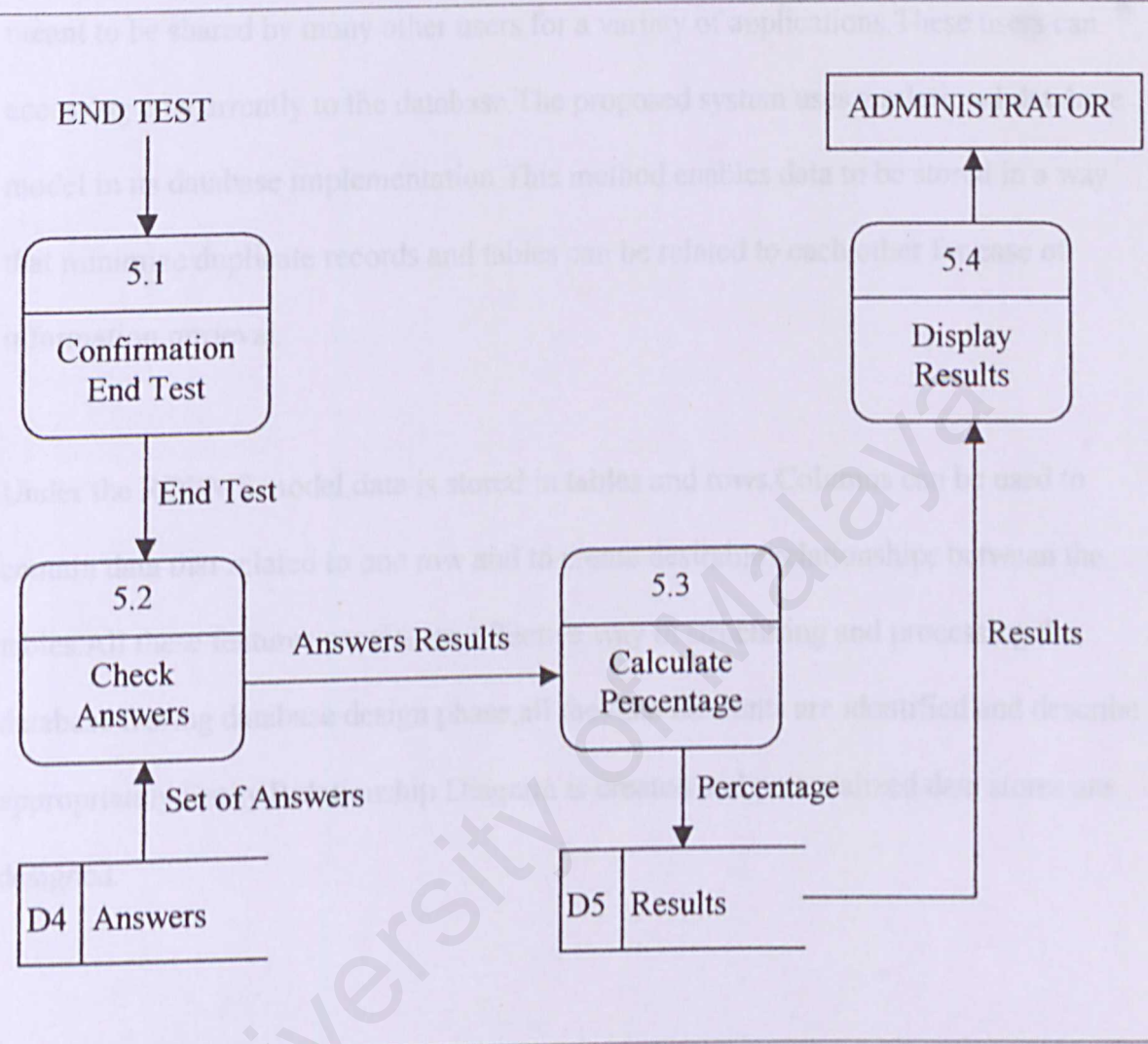


Figure 5.7:Checking Module DFD

Entity-relationship diagram is the convenient and convenient way to create a model of the users data. The things in the users world are represented by entities and the associations among these entities are represented by relationships. The models are usually documented in a Entity-Relationship Diagram (ERD).

### 5.3 Database Design

A database is not merely a collection of data or files. Instead it is a central source of data meant to be shared by many other users for a variety of applications. These users can access concurrently to the database. The proposed system uses a relational database model in its database implementation. This method enables data to be stored in a way that minimize duplicate records and tables can be related to each other for ease of information retrieval.

Under the RDBMS model, data is stored in tables and rows. Columns can be used to contain data that related to one row and to create desirable relationships between the tables. All these features provide an effective way in structuring and processing the database. During database design phase, all the data elements are identified and describe appropriately. Entity Relationship Diagram is created and personalized data stores are designed.

#### 5.3.1 Entity-Relationship Diagram

Entity-relationship diagram is the construct and conventions used to create a model of the users data. The things in the users world are represented by entities and the associations among those entities are represented by relationships. The results are usually documented in a Entity-Relationship Diagram. [Kroenke, 1998].



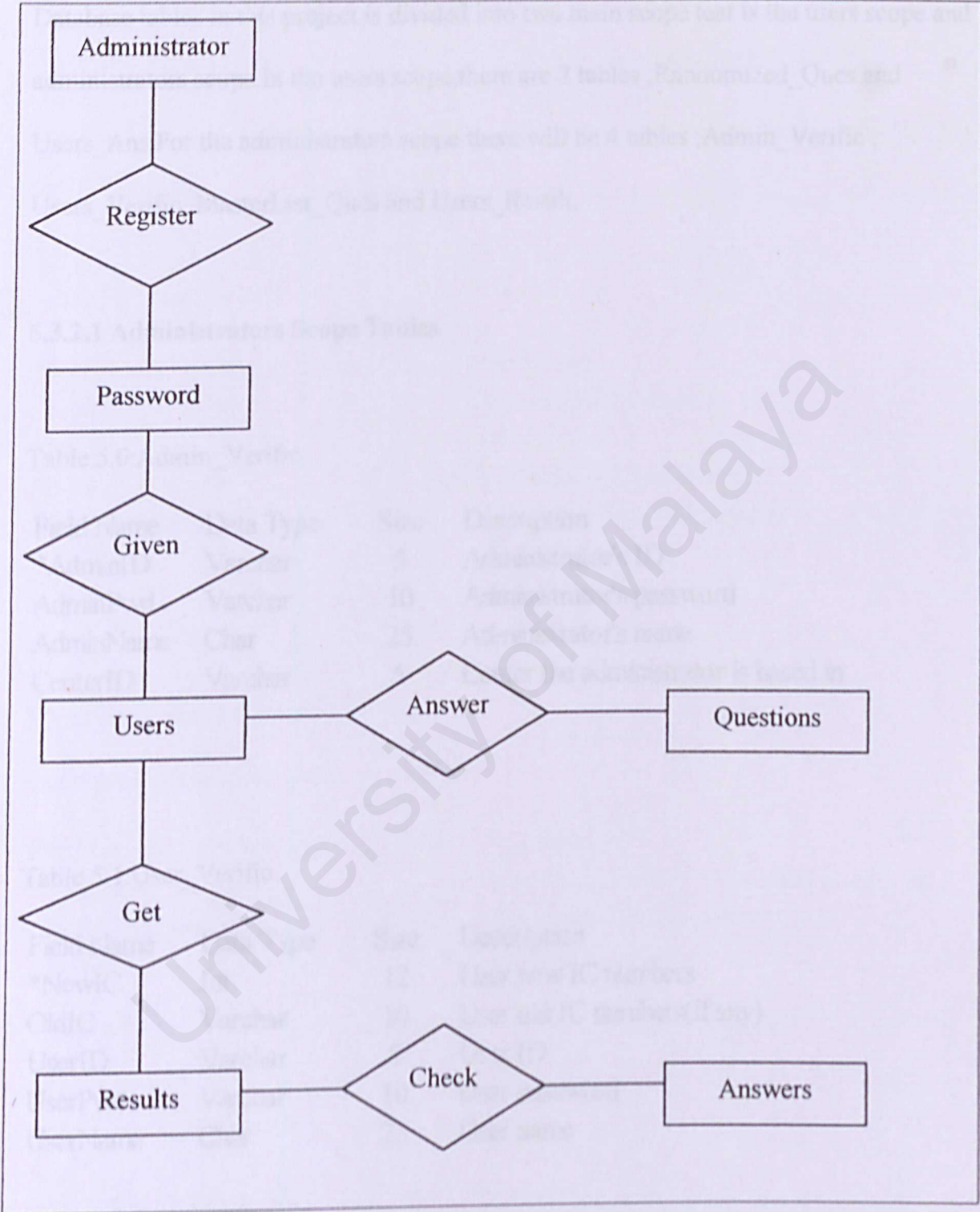


Figure 5.8:ER Diagram of the Electronic JPJ Test Taking System

5.3.2 Database Tables

Database tables in this project is divided into two main scope test is the users scope and administrators scope. In the users scope, there are 2 tables ;Randomized\_Ques and Users\_Ans. For the administrators scope there will be 4 tables ;Admin\_Verific , Users\_Verific ,MasterList\_Ques and Users\_Result.

5.3.2.1 Administrators Scope Tables

Table 5.0:Admin\_Verific

Field Name	Data Type	Size	Description
*AdminID	Varchar	5	Administrator's ID
AdminPwd	Varchar	10	Administrator's password
AdminName	Char	25	Administrator's name
CenterID	Varchar	5	Center the administrator is based in

Table 5.1:User\_Verific

Field Name	Data Type	Size	Description
*NewIC	Int	12	User new IC numbers
OldIC	Varchar	10	User old IC numbers(if any)
UserID	Varchar	8	User ID
UserPwd	Varchar	10	User password
UserName	Char	25	User name



Table 5.2:MasterList\_Ques

Field Name	Data Type	Size	Description
*MasterListNum	Int	3	Master list of questions numbers
Answers	Char	1	Questions answers
QuesSection	Char	1	Questions divided into 4sections(A,B,C,D)

Table 5.3:User\_Result

Field Name	Data Type	Size	Description
*NewIC	Int	12	User new IC numbers
UserID	Varchar	8	User ID
NumCorrect	Int	2	Numbers of correct answers
ResultPercent	Float	3	Percentage of correct answers

5.3.2.2 User Scope Tables

Table 5.4:Randomized\_Ques

Field Name	Data Type	Size	Description
*QuesNum	Int	3	Questions numbers of the randomized set
MasterListNum	Int	3	Master list of questions numbers
Answer	Char	1	Questions answers

Table 5.5:User\_Answer

Field Name	Data Type	Size	Description
*NewIC	Int	12	User new IC numbers
UserID	Varchar	8	User ID
QuesNum	Int	3	Questions numbers
UserAnswer	Char	1	Answers chosen by users

## 5.4 Graphic User Interface

Graphic user interface is important as it acts as a communication medium with the users in the human-machine interaction. The reality is that to a user the interface is the whole system itself. A good user interface allows users to understand the problem and operating the system without having to read the users manual or receive intensive training. There are 3 categories of interface design; general interaction ,information display and printed output and lastly data input.

### 5.4.1 General Interaction

The users interface is a system that crosses the boundaries of information display,data entry and overall system control. The main objective of an user interface is for the betterment of interaction between the system and the users. Thus it must be design in a way that will not burden the users. It must be simple in implementation to allow the interaction between user and system as easily as possible. A design that meet the above mention criteria is called a user friendly interface. To achieve a user friendly interface there are 3 guidelines to follow when designing user interface.

#### I. Be consistent

Screen layouts,menu selections,data display are consistent through the whole system to avoid confusion to the users.

#### II. Display messages or comments

Messages are given to indicate the status of the system during processing. If errors occur then it must prompt the users to choose an option.



### III. Ask for verification for non trivial actions

Users need to be ask for verification when requesting for procedure that produce significant changes to the output of the system. These action such as ending the test or logging out.

#### **5.4.2 Information Display and Printed Output**

In the display the screen must be not too congested with a lot of information. The information should be display according to its purpose. Important information need to be highlighted such as the timer in the test. The information need to be display clearly without any obstruction.

Output of each action should be related to the inputs. The results of the test must be clearly stated and users must be advised for certain action.

#### **5.4.3 Data Input**

Users must be able to perform selection of options and input the selection without having to look for it through out the page. The choices must be easily seen and changes to the selection display such as changes in colour or texture to the selection buttons will inform the status of the selection. The user interface must be forgiving or must be able to let users change their selection once the selection is chosen. This does not apply to non trivial action such as ending the test or calculating the results. But action such as changing answers during the test should be permitted.

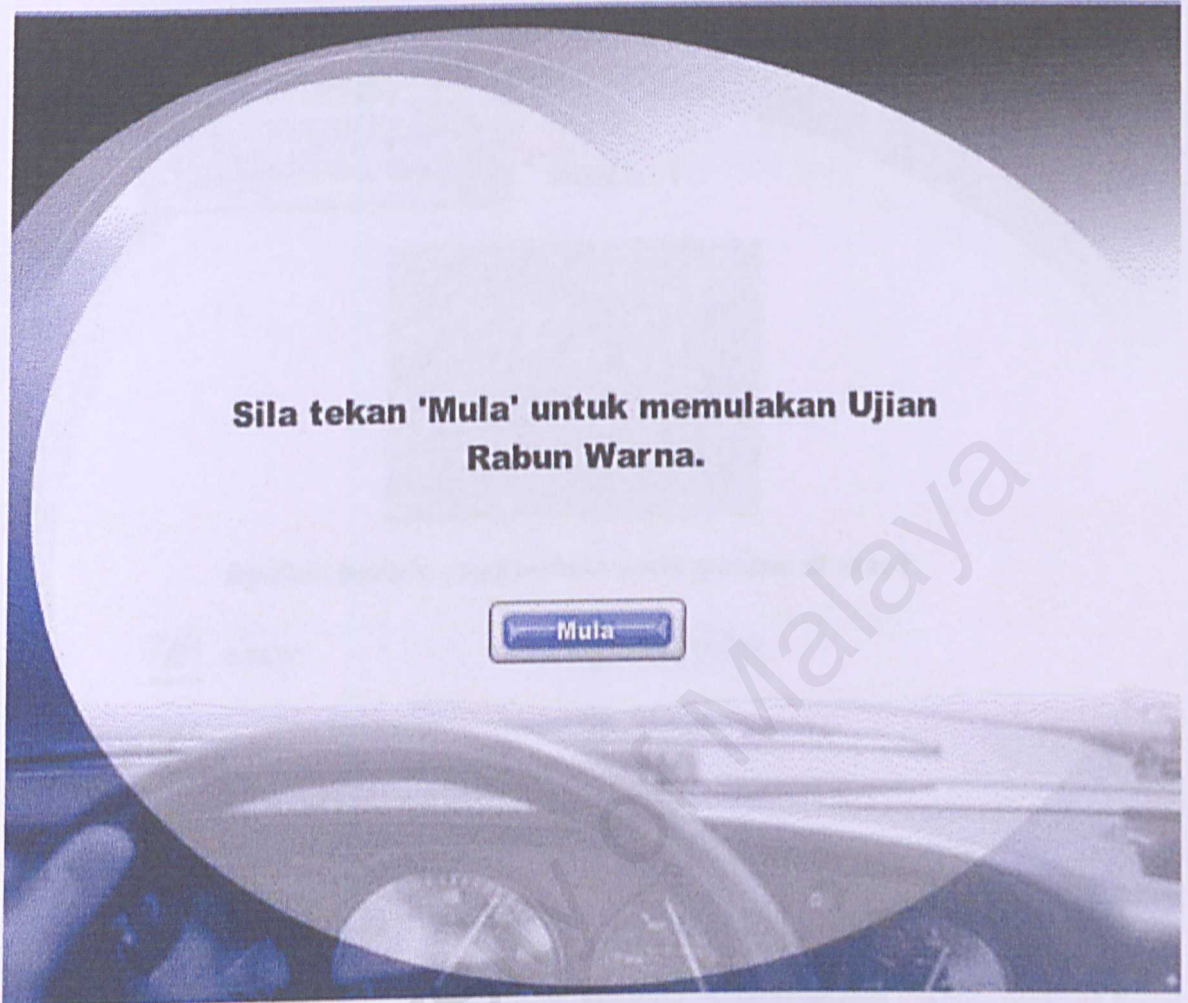


Figure 5.9:Start test screen

The starting screen is design to be as simple as possible. This is to prevent confusion for users. The only button in this screen is the start button. It also gives simple instruction for the users to click on the button if they intend to start the test.





Figure 5.10:Question 1 screen

This is the questions screen. All the other questions screen will have this same layout. The timer is put on top of the questions besides the questions numbers. There is also a red arrow to indicate the importance of noticing the timer.

Once the objectives answers is chosen it will be display on the left bottom of the screen. This will remind the users which answers had been chosen.

The end test button will be in red colour because it is a non-trivial action button.

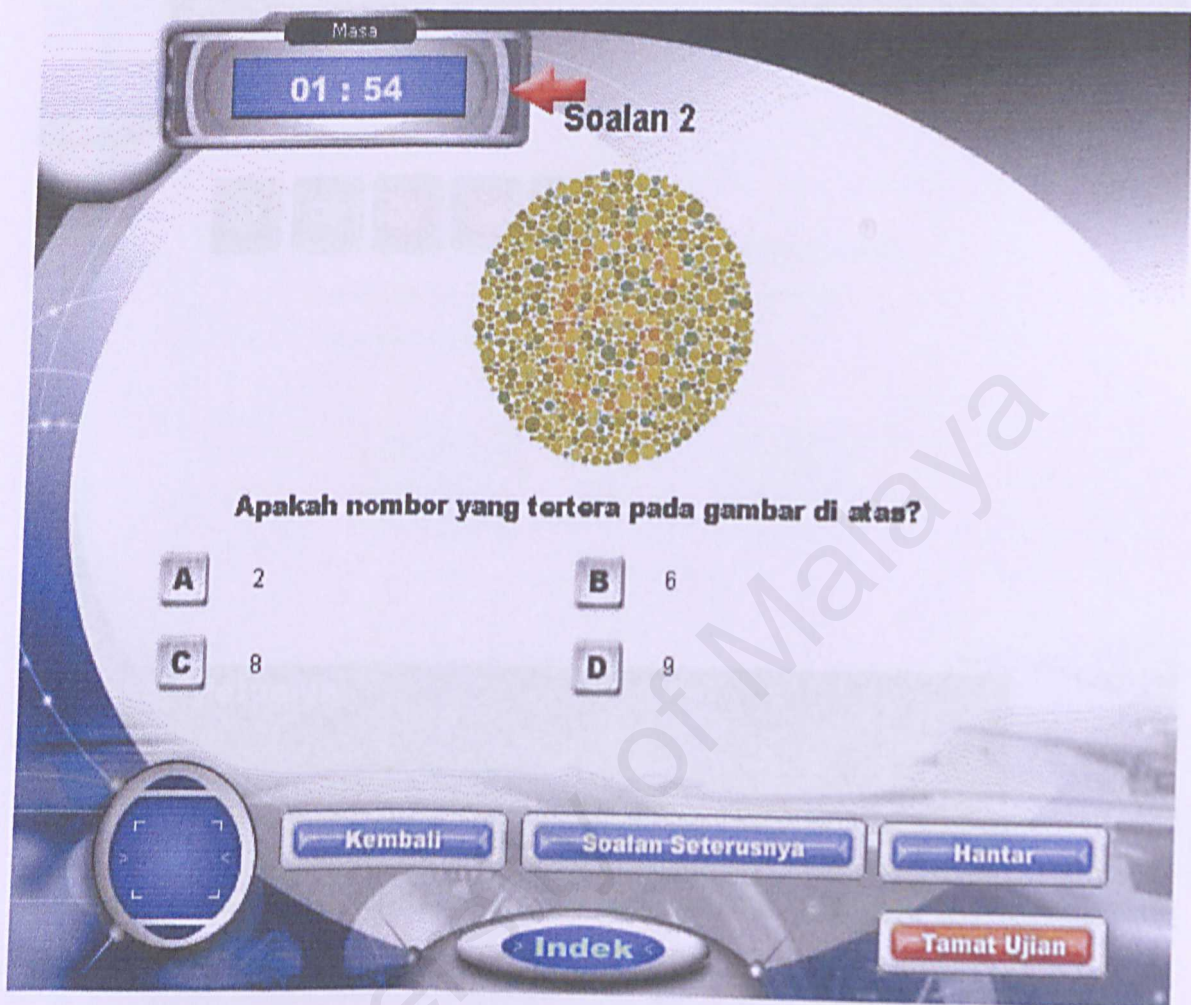


Figure 5.11:Question 2 screen

Each of the questions will have index page displayed if needed. The index button will navigate the users to the index page in which users can check their remaining unanswered questions. The back (kembali) button will display the previous question screen. The next button (soalan seterusnya) will go to the next question. The send (hantar) button will send the answers input and go to the next question.



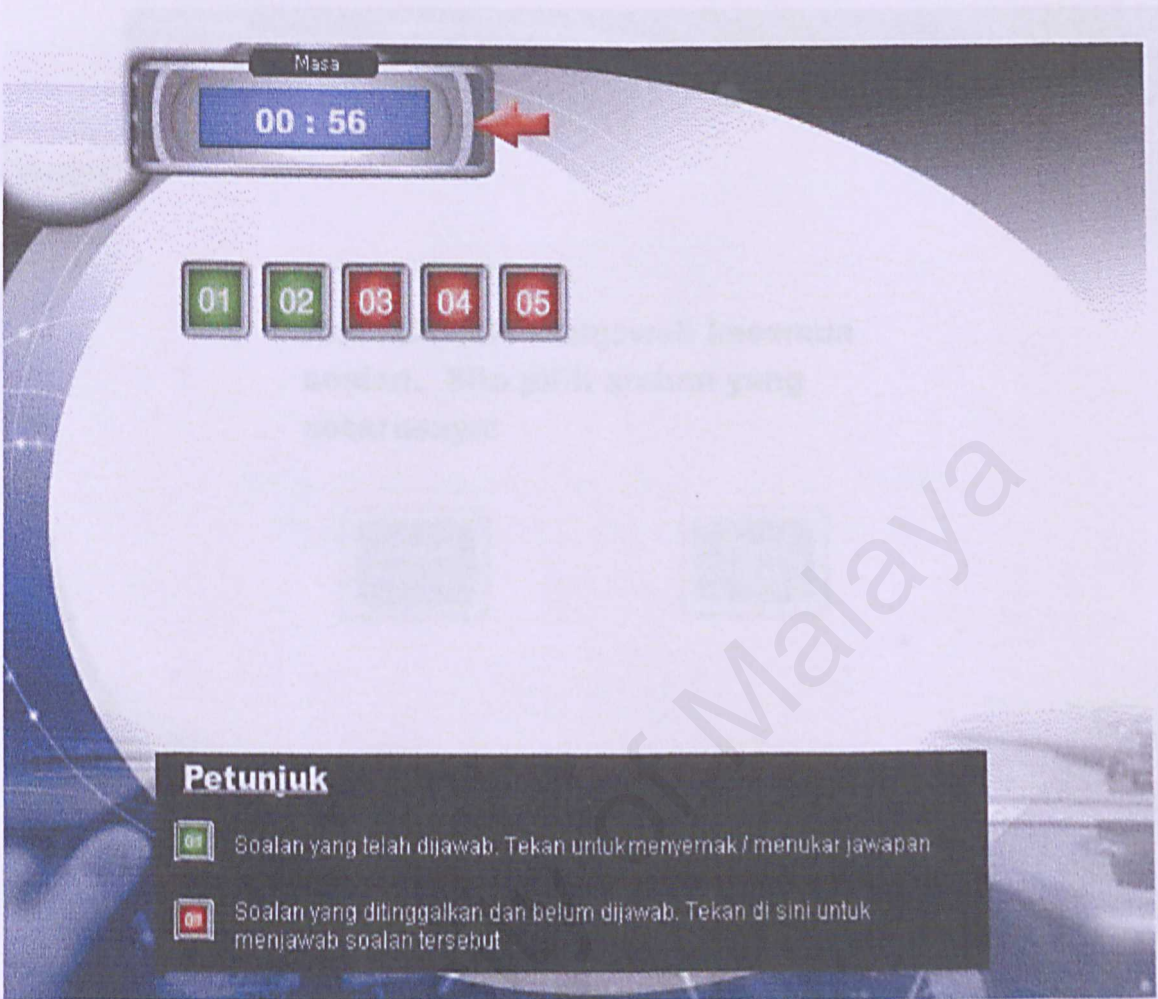


Figure 5.12:Index screen

The index screen will display the answered and unanswered question in the set of questions. The answered questions will be in green colour and the unanswered questions will be in red colour. There is also a legend at the bottom of the screen to tell the users the meaning of the colours.

Users can navigate to any of the questions in the index page by clicking on the button numbers itself.

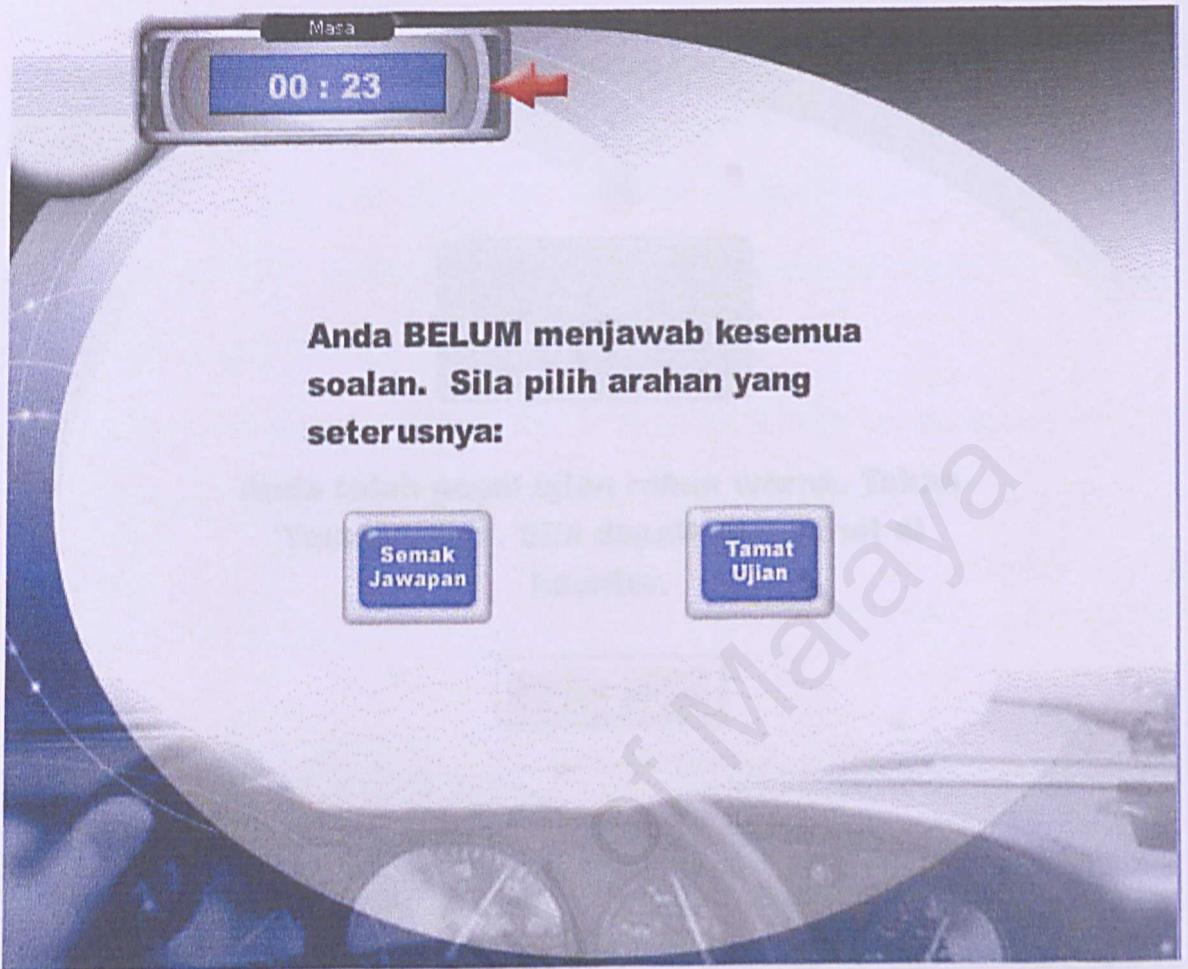


Figure 5.13:End test confirmation screen

The verification screen is to enable users to confirm the end of test.If the recheck(semak jawapan) is chosen then it will navigate the users to the index page where they can check the unanswered questions.If they choose the end test button(tamat ujian) then the answers will be check and result will be calculated.



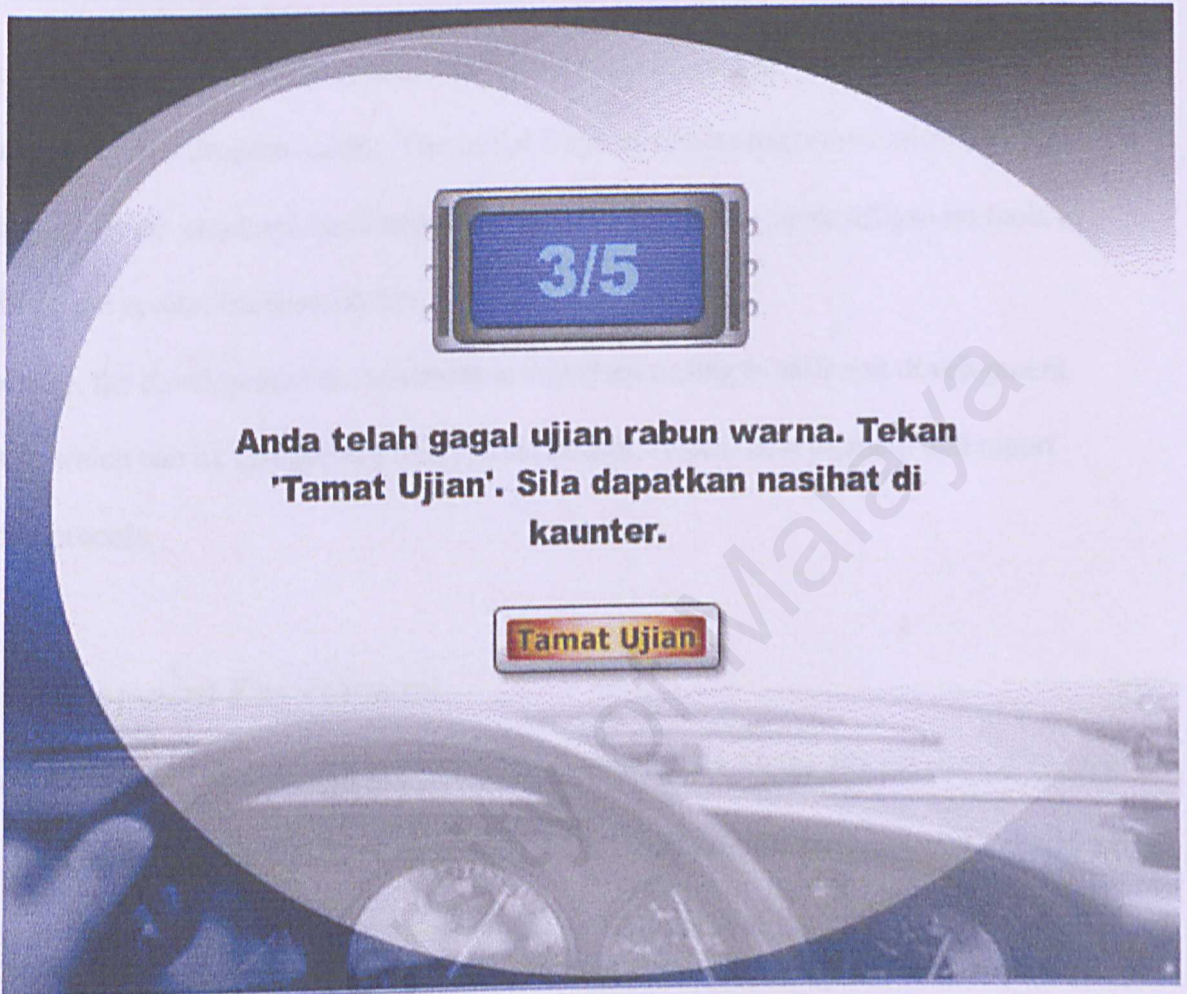


Figure 5.14:Result screen

The result screen will clearly display the users results. A simple instruction will be given to the users. The end test button will end the users test sessions.

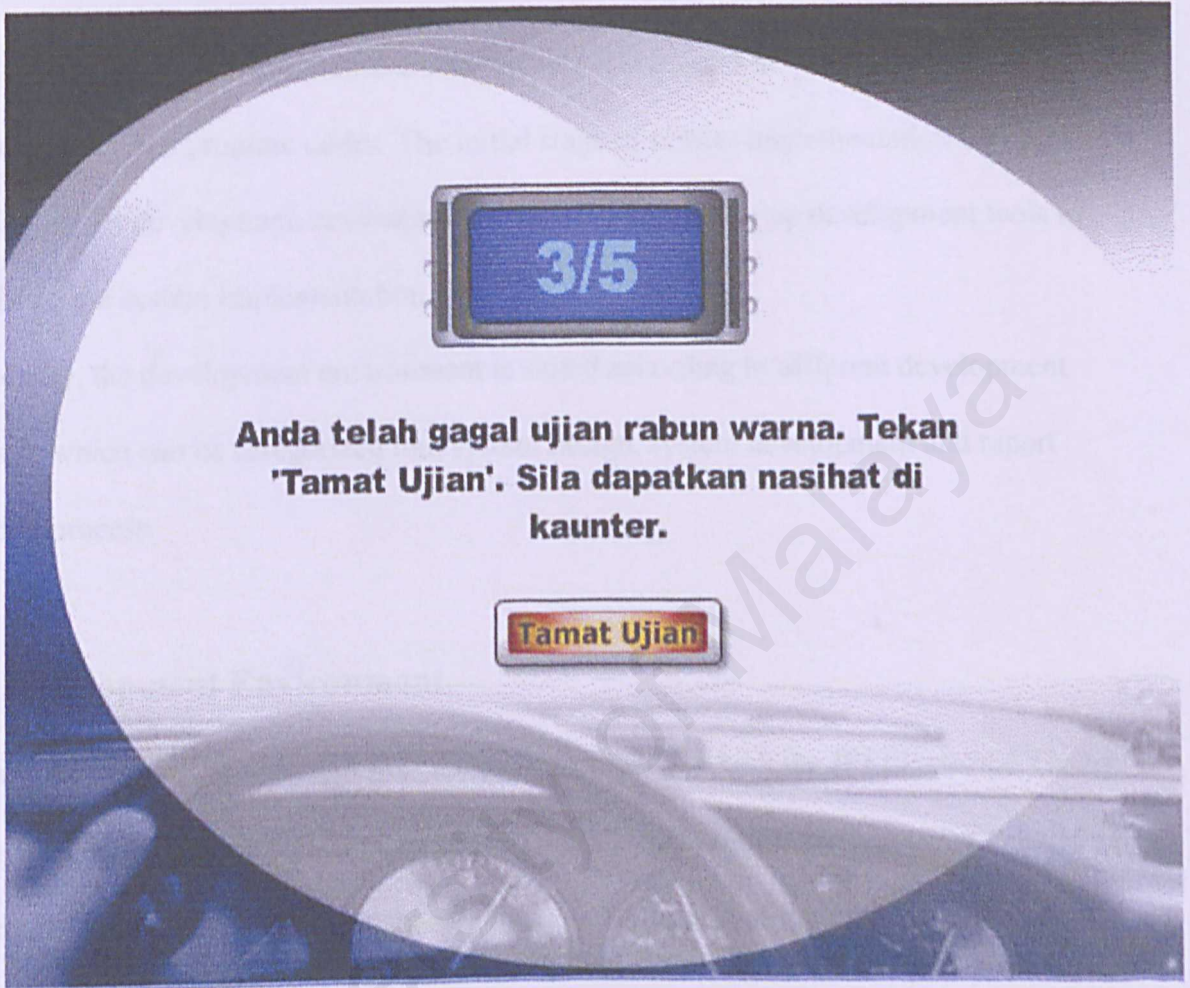


Figure 5.14:Result screen

The result screen will clearly display the users results. A simple instruction will be given to the users. The end test button will end the users test sessions.



## **6.0 SYSTEM IMPLEMENTATION**

### **6.1 Introduction**

System implementation in software development is a process to convert system requirements into program codes. The initial stage of system implementation involves setting up the development environment. This includes setting up development tools to facilitate the system implementation.

Generally, the development environment is suited according to different development phases, which can be categorized into system design, system development and report writing process.

### **6.2 Development Environment**

Development environment specifies the environment on which the JPJ Electronic Theory Test will be implemented. The development environment on which the system is build on is important as it plays an important role in determining the successful implementation of whole application.

### **6.3 System Design**

Although system design is clearly stated in chapter 4, nevertheless, during the initial stage of system development, a number of considerations and adjustments were done to the initial system design in order to match the actual needs and requirements.

6.4 System Development

The basic tools used for the system development are:

- ◆ Apache (Web Server)
- ◆ Microsoft Windows 98 (Operating System)
- ◆ MySQL (Database Management System)
- ◆ PHP 4.0 (Backend Programming Language)
- ◆ PHP MyAdmin (Database Tools)
- ◆ Macromedia Dreamweaver MX (Coding Editor)
- ◆ Macromedia Director 8.5
- ◆ Macromedia Dreamweaver (Image design tools)
- ◆ Adobe Photoshop 7.0 (Image design tools)



6.5 Program Development

Program Development is a process of creating the programs needed to satisfy an information system’s processing requirements. Program development consists of following 5 step. Review the program documentation design the code, code the program, test the program and completion the program documentation.

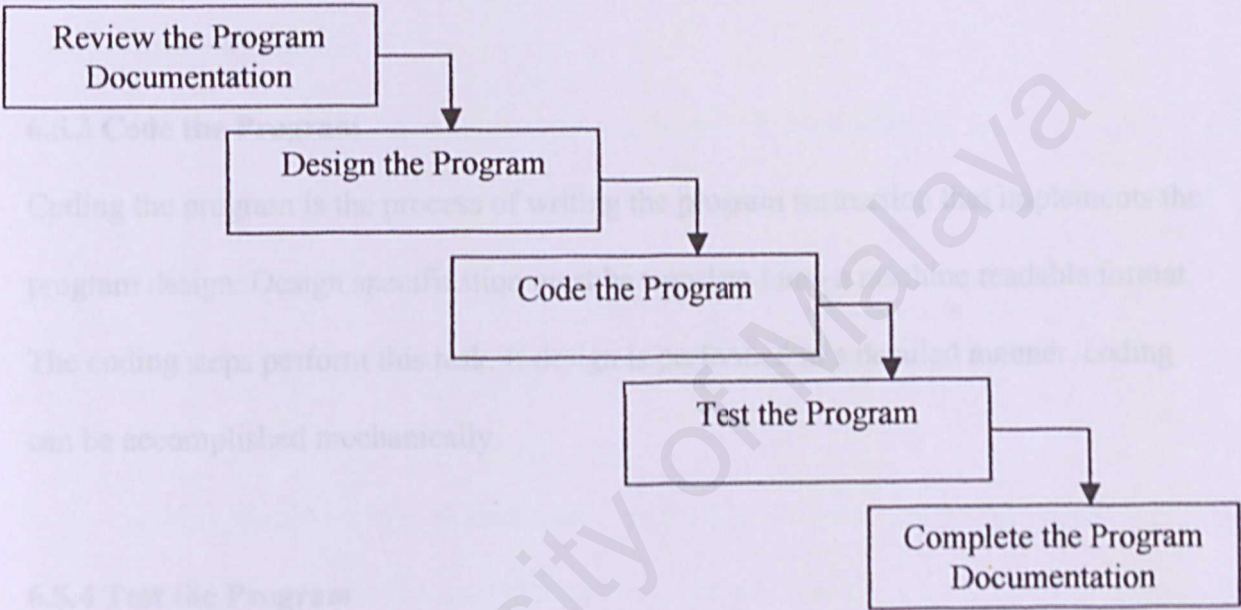


Figure 6.51:Program development flow.

6.5.1 Review the Program Documentation

The first step in the program development is to review the program documentation that was prepared during the previous phase. The program documentation of catalogue ordering systems of simple process description, report layout, data dictionary entries and the source documents. This documentation helps to understand better the work that needs to be recovered during the ending phase.

### 6.5.2 Design the Program

After the documentation is review, I need to design the program which is the second level of program design during the system development. For this second level program design, I have exactly decided how the program can accomplish what it must do by developing a program can accomplish what problems. The logical solution, or logic, for a program is a step by step solution to a programming problems.

### 6.5.3 Code the Program

Coding the program is the process of writing the program instruction that implements the program design. Design specification must be translated into a machine readable format. The coding steps perform this task. If design is performed in a detailed manner, coding can be accomplished mechanically.

### 6.5.4 Test the Program

During the testing program level, I must thoroughly test the program to ensure it function correctly before the program process actual data and produce information on which people reply on. I will perform several types of test on an individual program.

### 6.5.5 Document the Program

Accurate and complete program documentation is essential fir the successful operation and maintenance of the information system. This documentation includes the system user manual that may needed by most of the customers as well as system administrators.

## 6.6 Coding Approach



### 6.6.1 Methodology

The system is developed using a modular approach where each module is developed separately and are later integrated into a fully functional system. For each module, it is further refined into functions and procedures. By using a modular approach future modification and enhancements are made easily.

### 6.6.2 Coding Principles

The following principles were applied during the system implementation,

i) Coding Convention

Coding convention such as program labeling, naming variables, and indentation should adhere to. It provides easy identification for the programmer.

ii) Readability

Codes should be easy to understand. Adhere to naming convention such as naming and indentations contribute to program readability.

iii) Maintainability

Codes should be easily revised and corrected. To facilitate maintenance, code should be readable, modular and as general as possible.

iv) Robustness

The codes should be able to handle cases of user error by responding appropriately.

v) Internal Documentation

Internal comments provide a clear guide during the maintenance period of the system. Comments provided by the developer with a means of the communicating with each other readers of the source codes. Statements of purpose indicating the function of the module and a descriptive comment that is embedded within the body of the source code is needed to describe the processing function.

a program.

Bottom-up approach is adopted in system testing for D'S Electronics.

Each module at the lowest level of the system is tested by itself. Then, all

the tested modules would be related to the next module to be tested. It is repeated

until all the modules are tested successfully.

7.1 Types of Testing

In general, the testing process of D'S Electronics is shown in the following

figure. All the details will be explained in subsequent chapters.

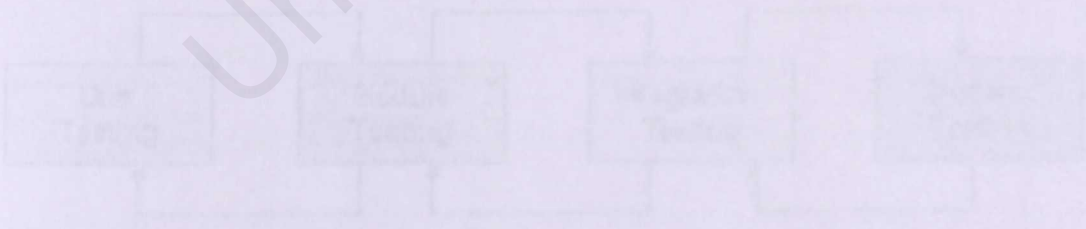


Figure 7.1 Testing Process



## 7.0 System Testing

The main function of testing is to establish the presence of defects in a program and to judge whether the program is usable in real application. Nevertheless, testing can only demonstrate the presence of errors. It cannot show that there is no error in the program. Therefore, a more suitable approach must be chosen to reduce the possibility of errors in a program.

Bottom-up approach is adopted in system testing for JPJ Electronic Theory Test Taking. Each module at the lowest level of the system hierarchy is tested individually. Then, all the tested modules would be related to the next module testing. This approach is repeated until all the modules are tested successfully.

### 7.1 Types of Testing

In general, the testing process of JPJ Electronic Test can be shown in the following figure. All the details will be further explained in subsequent sub-sections.

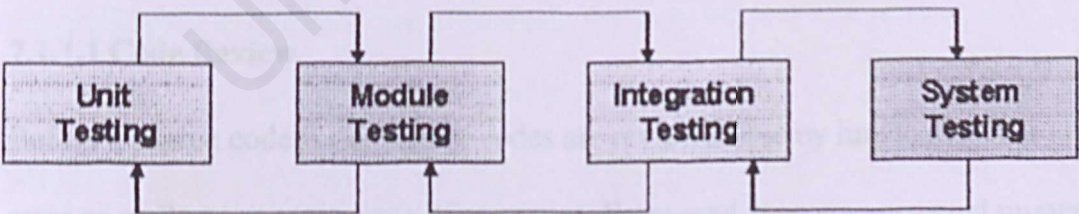


Figure 7.1: Testing Process

### 7.1.1 Unit Testing

Unit test is the process to test the individual component to ensure that they function properly. Each component is tested independently without the interference from other system components. Unit test is performed concurrently with the development process.

#### 7.1.1.3 Other Techniques

The codes in the components used in the JPJ Electronic Test are analyzed to determine the various states that the components will encounter. The test involves running the components in the browser and trying to identify the source of error from the error messages printed on the screen. After all syntax errors are eliminated, test cases are developed to test the codes. Input data is provided to the component in the system and the output is verifying its correctness. Test cases are developed carefully in order to capture the different behaviors of the component. Testing also involves boundary testing. Other than that, testing also checks to ensure that data from the database is being indexed correctly as the database server is located on a different machine.

Techniques used during the process of performing unit testing are as follows:

#### 7.1.1.1 Code Review

Before a source code is deploying, codes are reviewed line by line to discover any syntax error as well as semantic error. If errors are discovered, they are corrected immediately. Input is typed in and the output is verified for accuracy. This is done by double checking manually to verify that the query results yield records that exist in the repository and that the users does have the rights to view the records.



### 7.1.1.2 Tracing

This method is faster compared to code review techniques and it is efficient in discovering errors. During the compilation, the PHP compiler will detect type of errors in a program and display the error type as well as the line number in which the error occurs.

### 7.1.1.3 Other Techniques

Other techniques are debugging and use code behind to discover any error during the development.

## 7.1.2 Module Testing

Module testing is performed without other system modules. A module consists of a collection of dependent components to perform a particular task or function. Different possible test cases are applied to the module and the test results would be verified.

Unusual results will be analyzed and they would help in debugging sub-modules in order to produce the desired output.

## 7.2 Integration Test

Integration test is needed when all modules are integrated. The main focus in integration test is to navigate the interfaces repeatedly to detect any interface mismatch problem.

Several important aspects are checked to ensure that the flow of the data in JPJ Electronic

Test is well organized and are user friendly to all the system users. The system use a

bottom up testing. Each module is tested for its ability to function after integration. The

flow of information from one module to another is verified for accuracy.

7.2.1 System Testing

The sub-systems are integrated to make the entire system. Therefore, the main purpose in system testing is to find errors that result from unanticipated interactions between sub-systems. Besides, it is used to validate whether the system meets its functional and non-functional requirement.

Problems might occur by the time the new developed system is integrated. The test covers the performances, reliability, accuracy and other criteria. Testing is carried in the manner as though the system is in use.

3.2 Questions and Answer

In this module, questions will be displayed according to the position in the set of question. Answers from the users will be stored in database table. Their answer can be change if the user is not satisfied with their answer. Level of answers will be just clicking on the button and provide it. Users can navigate through the set of questions using navigation buttons or by referring to an index page where all the questions numbers are listed out to indicate unanswered questions. An index page is needed to give the users an overall navigation view of the whole set of the test. A list of all unanswered questions numbers will be display in a table which the user click on any number button to go to the question directly to answer the question or change the answer. Each page would displayed the time is spent by user.



## **8.0 SYSTEM'S MODULE AND FUNCTIONALITY**

### **8.1 Selecting Questions**

This module will take care of operation of the questions store in database. These operations include storing, randomizing and sorting questions. The questions in the database will be divided into sections according to their type. In a set of randomized question, each section will have a stipulated numbers of questions in it. There will be no same question appear twice in the same set of randomized questions of the same candidate. Random access to any question will be sorted out. Each set of question will be store in a database table. This is for the purpose of checking the final answers from users. The answers can be change if the user is not satisfied with the previous answer.

### **8.2 Questions and Answer**

In this module, questions will be display according to its position in the set of question. Answers from the users will be sorted in database table. These answers can be change if the user is not satisfied with the previous answer. Input of answers will be just clicking on the button and press send. Users can navigate through the set of questions using navigation buttons or by referring to an index page where all the questions numbers are listed out to indicate unanswered questions. An index page is needed to give the users an overall navigation view of the whole set of question. Answered and unanswered questions numbers will be display in different colors. Users can click on any number button to go to the question directly to answer the question or change the answer. Each page would displayed the answer inputted by users.

### 8.3 Checking

After every test ended the answers from users will be checked and results will be displayed stating the percentage the users score. A user can end the test whenever he feels like it. But there will be also a time period a the users must finish the test. The test will end automatically and the answers will be checked when the time is up. The module will also be able to checked answered and unanswered questions. This will be use to display in the index page.

### 8.4 Verification

Each user will be given a password and ID before the test start. This ID and password will be needed to enter the online test. The password will be generated randomly. The ID will be the ID of the computer each candidate use. Any given password will be check to avoid any duplicate in the password of different user. The ID and password will be store in database to identify the results of the users in the end of the test. Each administrator would be require to input their ID and password also before every test start.



## **9.0 SYSTEM EVALUATIONS AND CONCLUSION**

Evaluation is the ultimate phase of developing a system and an important phase before delivery the system to the end users. Evaluation was related to user environment, attitudes, information priorities and several other concerns that are to be considered carefully before effectiveness can be concluded. At all phases of the system approaches, evaluation is a process that occurs continuously, drawing on a variety of sources and information.

### **9.1 Problems Encounter and Solutions**

#### **9.1.1 Setting up server**

Many problems faced in setting up the relevant servers in the JPJ Electronic Theory Test Taking . This problem is due to lack of experiences in dealing with the servers. Many problems are also faced with problems of configuring the Apache web server. Among the problem face in configuration is setting the session handling capability. In the new feature in PHP 4, the session handling is handle more carefully to adhere to the security reason. In the configuration file, the session path is change to a windows base YRL for example C:/PHP/tmp. Default it was based on UNIX naming method. Furthermore to initiate the global declaration functionality, the register global must be turn ON.

### **9.1.2 Interconnecting Server**

Problems are faced trying to interconnect the Apache web server, database server and PHP modules. The Apache is unable to detect the database server even though connection string is written probably. PHP module have to be installed properly to avoid incompatibility of it's connection with the server. There are more than 50 over modules to choose on and decide whether it is necessary to be install. Installation of modules need to be careful to avoid a slugging in the web server performance.

### **9.1.3 Unfamiliar with New Technology**

PHP are still new technology to the computing world compare to others more establish server side programming such as PERL Cold fusion, JSP and ASP. Problems are faced in understanding the concepts and implementing the new technology to develop modules to support the desired task.

### **9.1.4 Development Platform**

The development platform used is Dream weaver MX. This is a rather new development tools. Even though it's functions are up to date and advance but this not only make the development process more complex but also the learning curve of using the editor is lengthen. There are a lot of functionality need to be explore and try and error techniques used are time consuming. Information in using the Dream weaver is still rather constraint to it's official web page. The references books are more scarce and expensive. Thus forbid the method of reference through printed media.



## 9.2 Solution

### 9.2.1 Setting up the Server

The setup of the server even though is complex in a sense but the problem is not irresolvable. References can be made through related websites and printed media. As the development of the Apache web server is fast, website is the best reference since it is updated regularly. It's users manual is a source of configuring the server.

### 9.2.2 Interconnecting Server

The problem of interconnecting the Apache web server and the database is solved through setting-up trust relationships among the related server. The problem with installing the appropriate PHP modules can be solve through reference to related websites and through forums available on the internet. Try and error sometime will resolve the problem but this approach is time consuming.

### 9.2.3 Information Gathering

In trying to solve the various problems faced in the development of the JPJ Theory Test, I went to browse through the PHP.net web site to look for possible solutions. Apart from the PHP.net web site, other PHPBuilder.com and webdeveloper.com site is also of a great help. I also tried to get advice from developers, programmers through the forums available.

## 9.3 System Strength

### 9.3.1 Wide Accessibility

The JPJ Electronic Theory Test is a web base system. This has provided wide-accessibility to users where users can access from within any computer in the designated centers approved by the JPJ. Client-side application only requires the installation to the web server for access of its client computers. Furthermore, browsers are available across all platforms.

### 9.3.2 Confidentially and Integrity of Information

The strength of the system lies in the capacity to perform the test taking directly connected to the server. Only information which the user has access to will be published such as the questions and it's multiple answer. The real numbering of the questions is hidden from the users thus it's randomness is assured. This feature protects confidentiality of information and also maintains the integrity of the information.

### 9.3.3 High Scalability

The Electronic Theory Test is highly scalable. It has scalability, which it is possible to add more questions easily to the questions repository in the future. The repository does not have to locate on the same machine as the Apache server. This feature makes it possible to implement a dedicated file server or database server. All that needs to be done is to set up trust relations between the servers and create virtual directories so that Index server will be able to index the data.



### 9.3.4 Automatic Result Update

Once the user finish the test by clicking finish the result will be calculated instantly. The result will be inserted into the database automatically. This approach will avoid errors cause by manually entering results data into the database. The integrity of the data is ensured.

### 9.3.5 Randomness of the Questions

The set of questions generated will be different form each other since it is subjected to a strict random function. This random function will generate unique sets of question that the possibilities of two same sets of questions produce are nearly zero. The uniqueness of the question sets will prevent the candidates from knowing and memorizing the answers only.

### 9.3.6 Instant Result

As the answers will be checked instantly the result will be known instantly by the candidates. It will prompt a result message to the users and further advise will be given to the candidate depending on their results. This will enable the candidate from retaking the test on the same day and not by waiting for another day like the current written test system.

## **9.4 System Limitation**

### **9.4.1 Platform**

The Electronic Theory Test system is limited to certain platforms in term of openness. It supports Window 95, Window 98, Window NT, Window 2000 and Internet Explorer 4 or above. Netscape 4.0 or above is recommended for it's Cascading Style Sheet(CSS) to work properly.

### **9.4.2 Searching Capability**

This system does not implement the capability of searching for a registered candidate. It can only manually search for the candidate based on his identity card numbers. Although it is lack of the searching capability but searching for a candidate will not be an option to the administrator. Administrator will only be able to browse the candidate information through the database and not through the users interface.

## **9.5 Future Enhancements**

As mentioned before, JPJ Theory Test is still not fine enough to work at its full efficiency. Some refining work needs to be done to the system to increase its usability and reliability. The aspects to be refine and some suggestions to upgrade the system are as below:



9.5.1 Access Monitoring

Future enhancement of this system is to provide a simple access monitoring, which may have the following function:

Update a version number of the registered candidates.

Provide logging of the users and administrators who have check out the database, in and out.

9.5.2 Security

Encryption of data. Also should be the data sent via FTP between servers in different centers, encryption will ensure that hackers will not be able to tap into the lines. File name of all that files that stored in physical directories are not the original file name. We can use file ID so that other people cannot easily view the filename and open the file using appropriate software.

Each connection to the server is protected by SSL session and optionally implement iVest for non –repudiation authentication

## 9.6 Knowledge Gained

During the entire development of JPJ Electronic Theory Test Taking, a lot of knowledge had been gained. The following are some of the knowledge gained:

- i) A golden opportunity to learn additional programming skills such as PHP, JavaScript, SQL and HTML.
- ii) During process of development, there is opportunity to set up the windows, Apache web server and mySQL database. This would better the understanding the of the server build up.
- iii) Have hands an experience to plan and develop a system.
- iv) Improve skills in time management.
- v) Have chance to explore some software, which are not familiar before such as Dream weaver MX, Director 8.5 and PHP My Admin.
- vi) Ability to work independently and under pressure.
- vii) Enrich the experience in problem solving.

## 9.7 Review On Goal

At the final stage of the project, there are certain expectation on what would be achieved. The following expectation that were achieved.

### 9.7.1 Expectation Achieved

In overall the system has fulfilled the expectation stated by the project. The basic foundation of the system is designed and implemented. The system is able to provide the function need by the test requirements. It is eligible for future growth and



implementation. The JPJ Electronic Theory Test Taking meet the criteria like reliability, user friendliness, open system and wide accessible.

### **9.7.2 Objective Achieved**

The project has successfully created a dynamic test taking system that support real time interaction and store data using MySQL. The system would be able to achieve the target of having a proven system of randomness and integration. Finally it could be concluded that the system had achieved it's target objectives.

## **9.8 Overall Conclusion**

Within the completion of the system, a well-organized and integrated system is provided. The system is also expected to act as a integration of candidates and administrators. The system is comprehensively developed to solve the on-going imperfect method of written test done currently.

The entire system was carried out according to specified system requirements. The system is not a source, fastest and easiest way to take the test but also provide adequate and efficiency to monitor the test taking.

In my opinion, students should appreciated the learning process along the development of the system, which give us the opportunity to develop and improve our supervision reviewing, analysis and design a project under the guidance and supervision of lecturers more over, this thesis project also serves as a channel for students to apply both theoretical and practical skills learn.

# Appendix A: Installation & Configuration

## A.1 Installation

### A.1.1 MySQL



Figure A.1:MySQL logo.

1. When you run setup.exe the Welcome screen pops up. Click on **Next**.

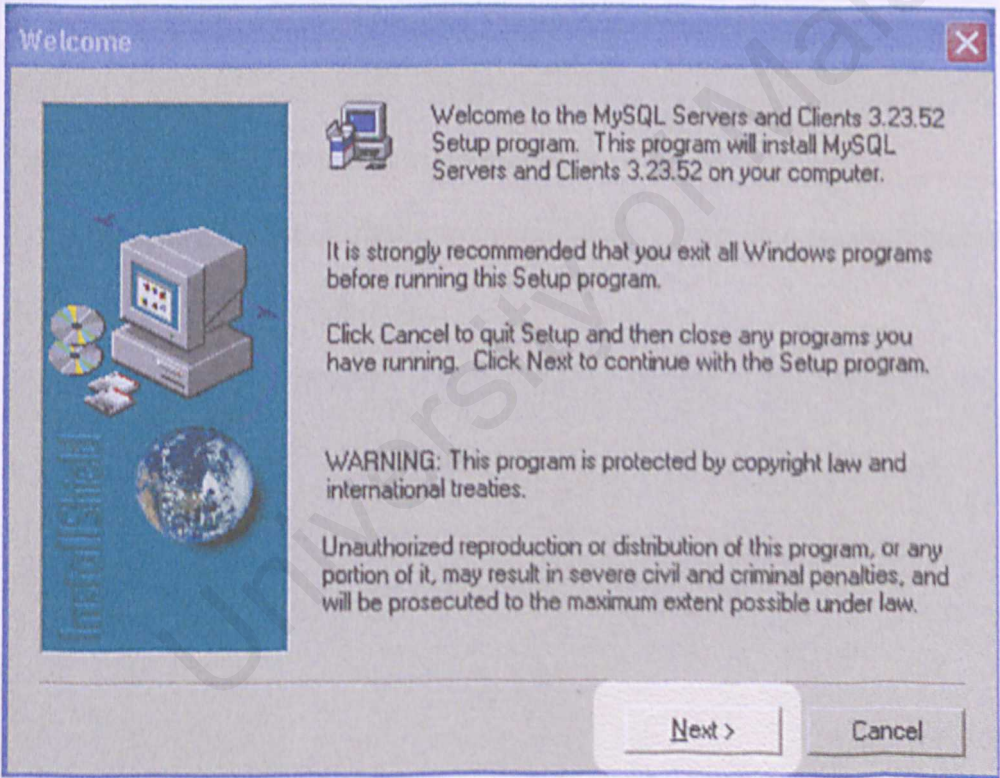


Figure A.2:MySQL installation starting screen



2. You will now see the **Information** window that displays an important note on the installation path. Click on **Next**.

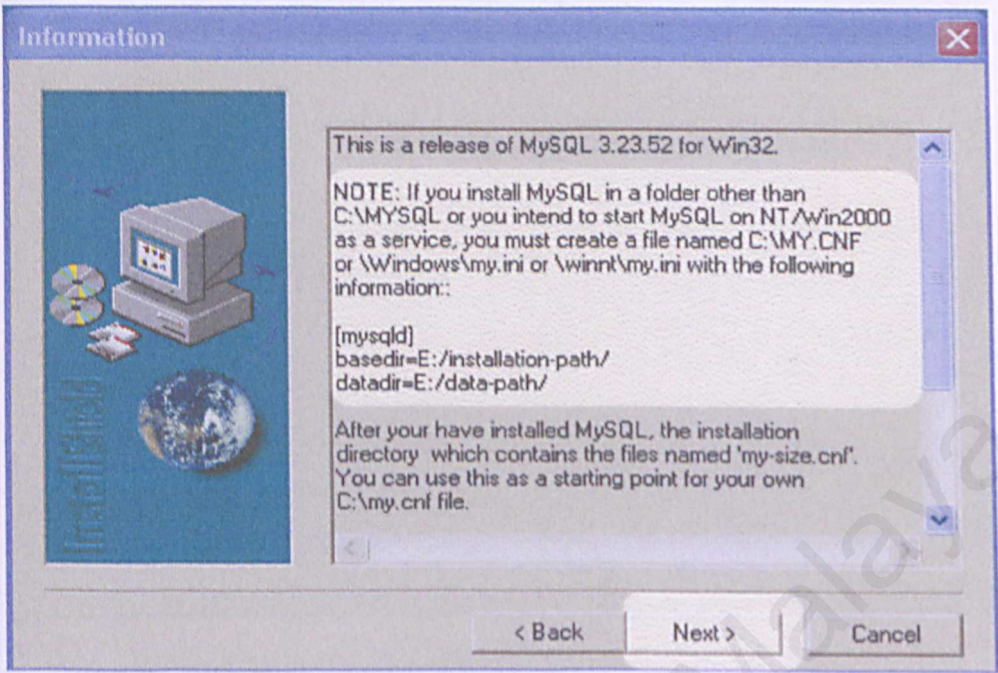


Figure A.3 :MySQL installation information .

3. Choose the destination folder to install MySQL into. It is **recommended** to leave the **default path** as it is. Click **Next**.

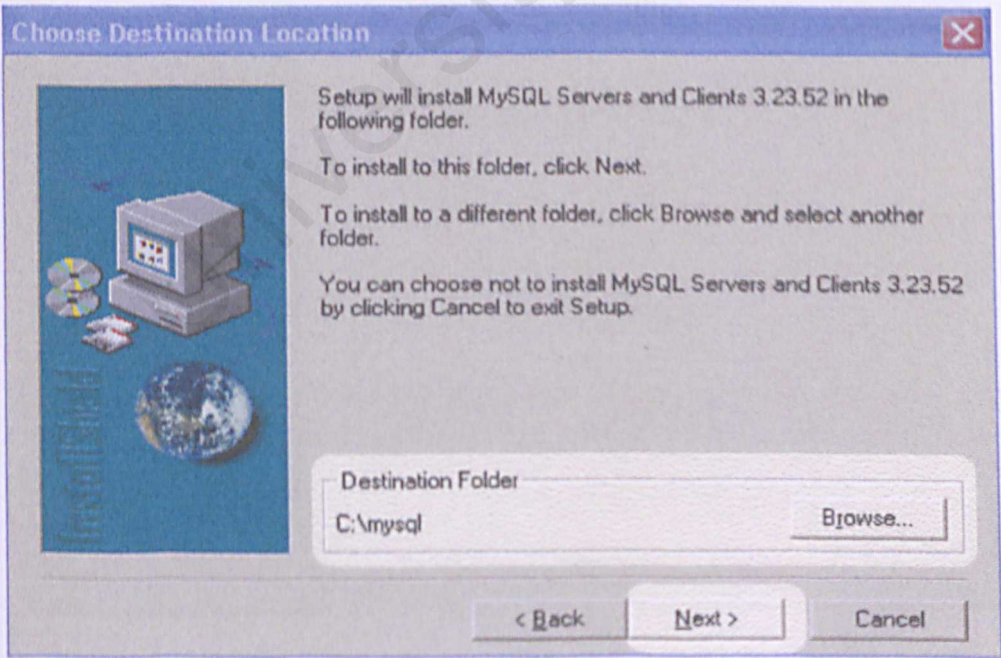


Figure A.4 :MySQL folder installation option.

4. Choose a setup type. **Recommended** is **Typical**. Click **Next**.

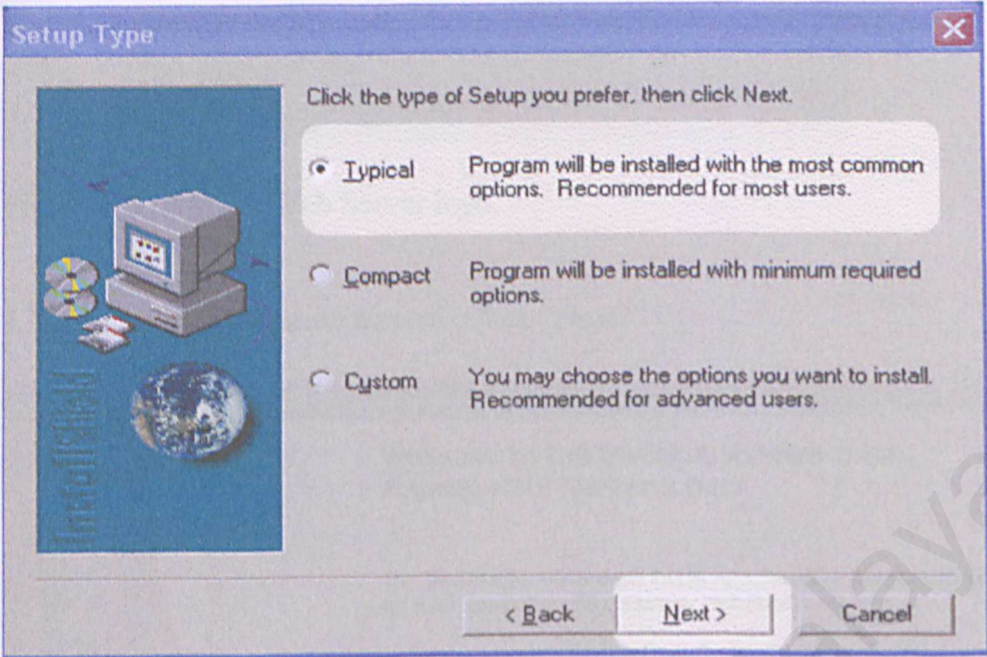


Figure A.5 :MySQL setup type option.

5. MySQL will begin installing. Once installation is done click **Finish**.

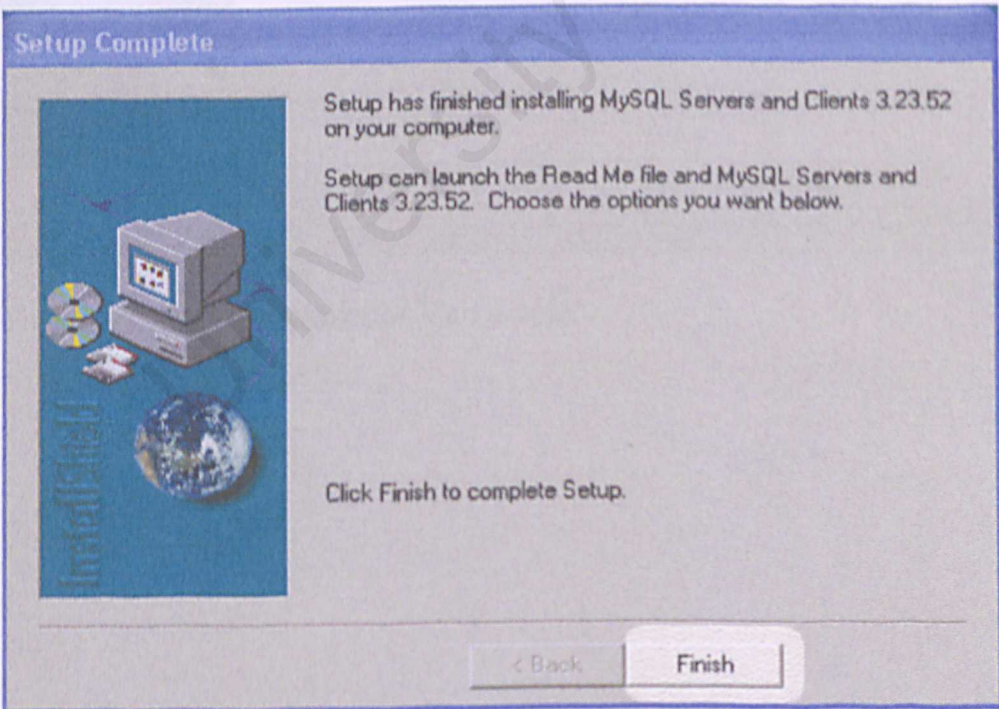


Figure A.6 :MySQL complete installation.



A.1.2 Apache Web Server

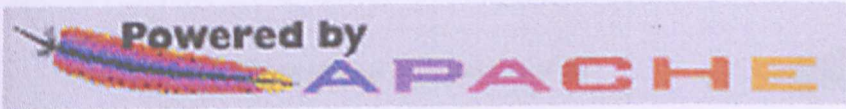
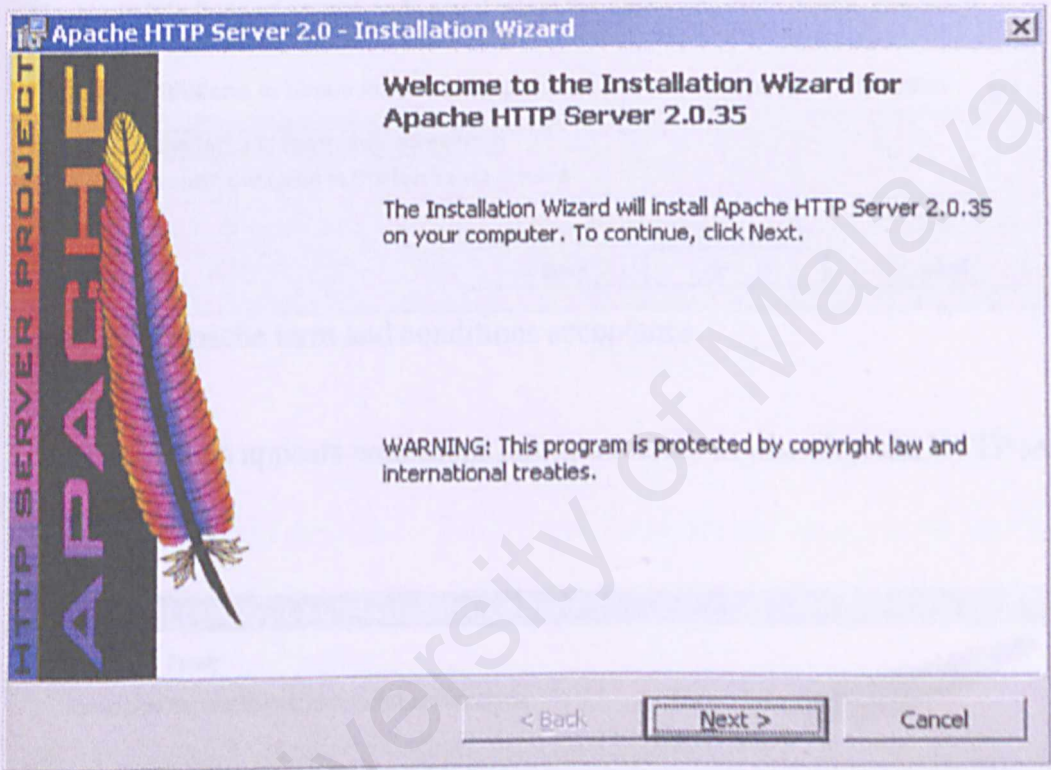


Figure A.7 :Apache Web Server logo.

1. You'll see this welcome screen. Click "Next".



FigureA.8 :Apache installation start screen.

2.You'll see the License Agreement. Check the "I accept" radio button and "Next".

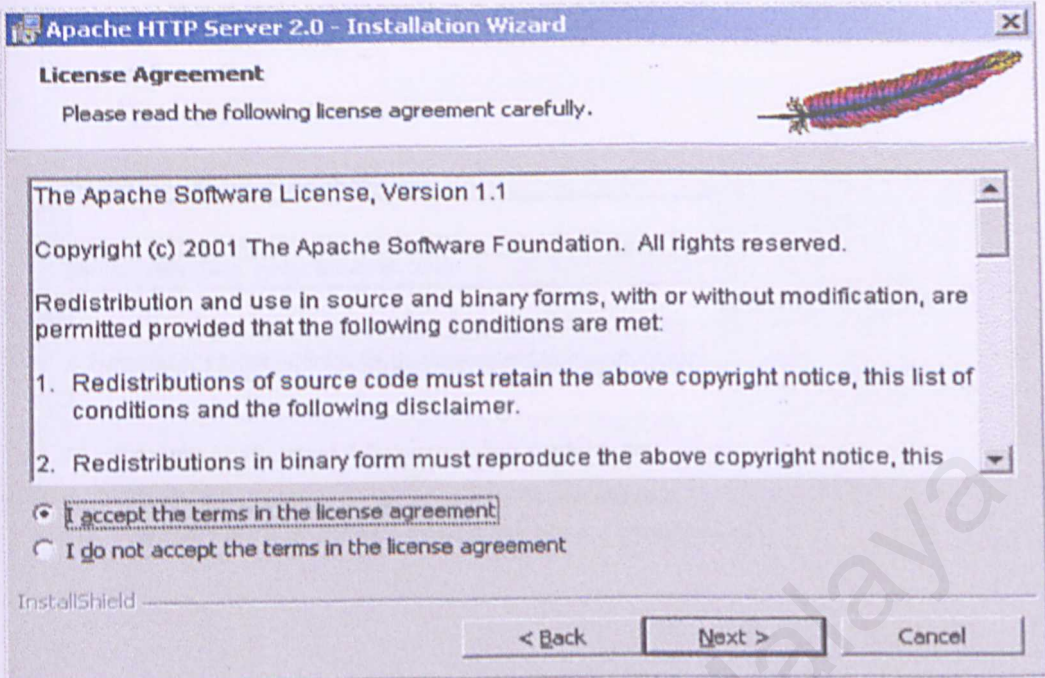


Figure A.9 :Apache term and conditions acceptance.

3.Another screen appears with more information about what Apache HTTP server is.

Click "Next".

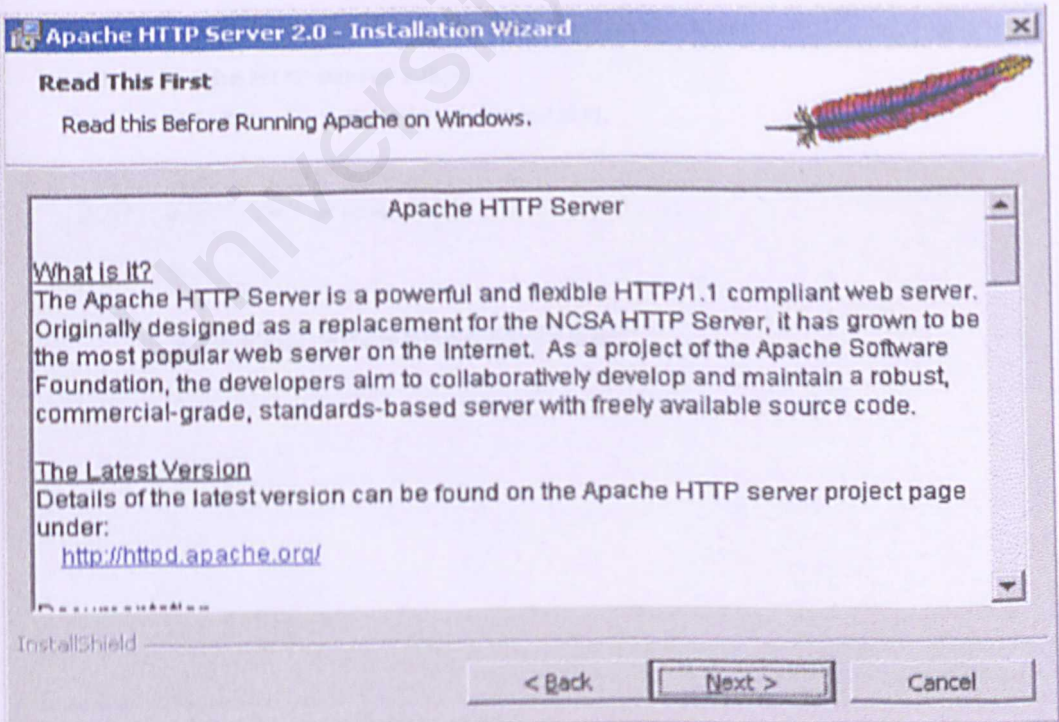


Figure A.10 :Apache installation information .



4.The configuration now begins.

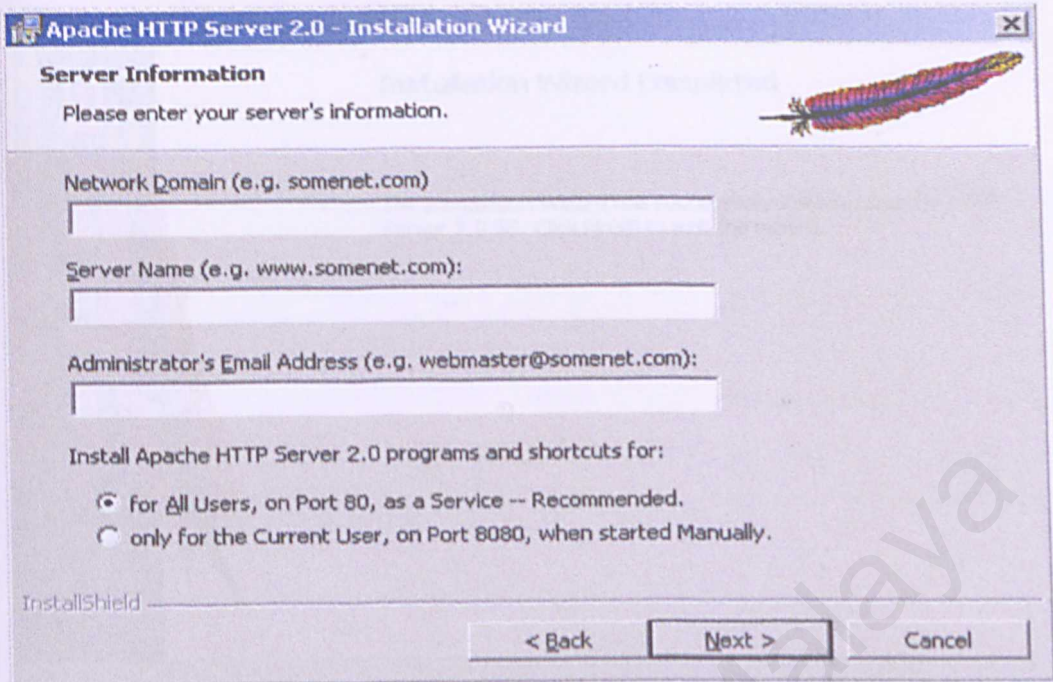


Figure A11 :Apache server information entry.

5.Choose where we want to install Apache.You can change it by clicking on the "Change" button and selecting directory you like.Here we'll keep it default."Next".

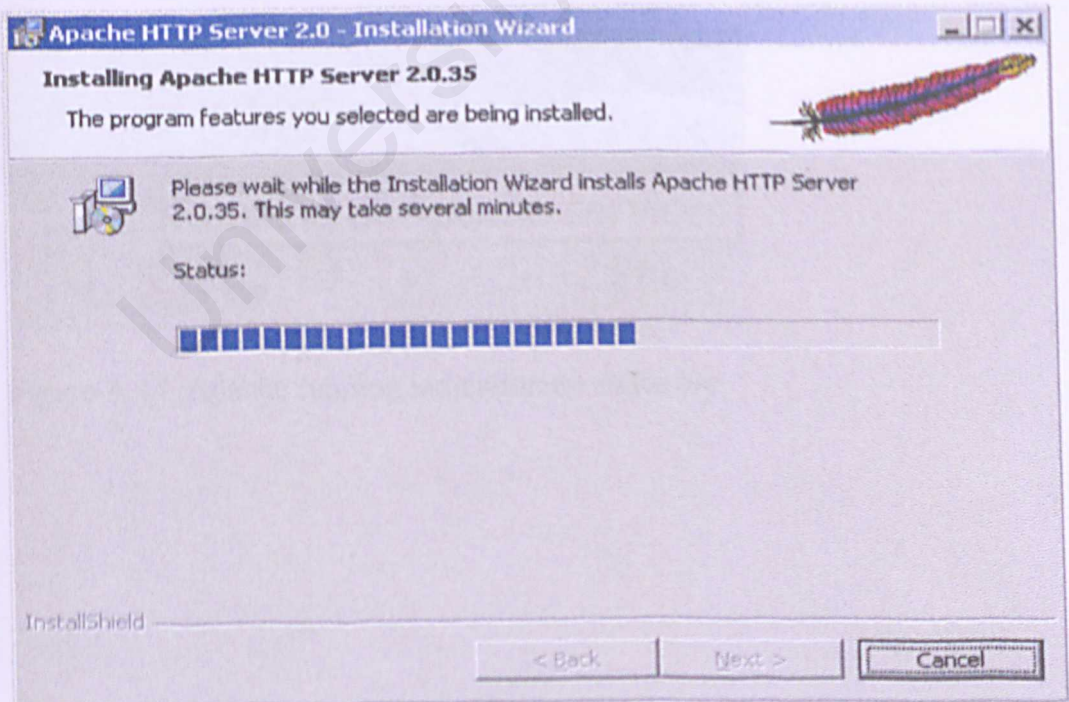


Figure A.12 :Apache installation status.

6.After some time, you'll see that the "Installation Wizard Completed".Click "Finish".

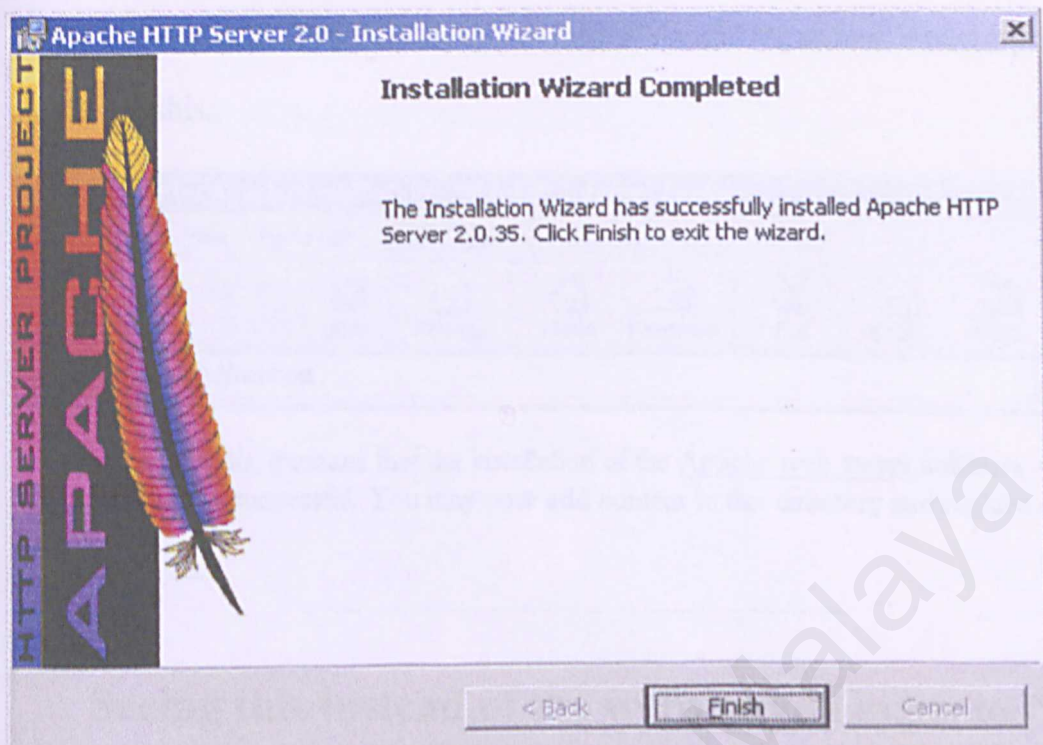


Figure A.13 :Apache installation complete.

7. You see that little new icon in your system tray? That shows you the status of Apache.



Figure A.14 :Apache running indication on status bar.



8. Check whether Apache works now. Fire up the web browser and type in "http://localhost" or "http://127.0.0.1" and see if you get the default Apache page. You should see this.

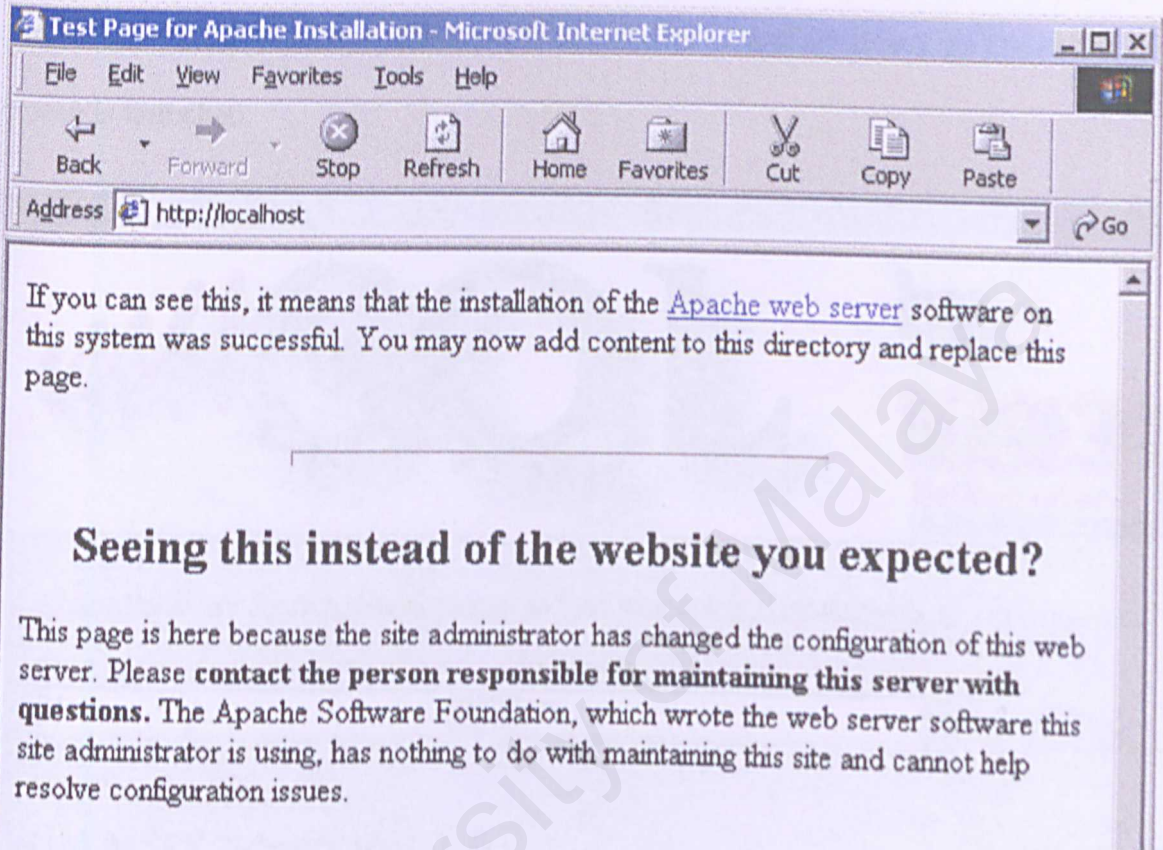


Figure A.15 :Apache web server default page

## A.2 Configuration

### A.2.1 MySQL

1.Run WinMySQLAdmin.exe, once started WinMySQLAdmin will try to locate the 'my.ini' file in the Windows directory. If the 'my.ini' file is not found the Quick Setup screen is launched:

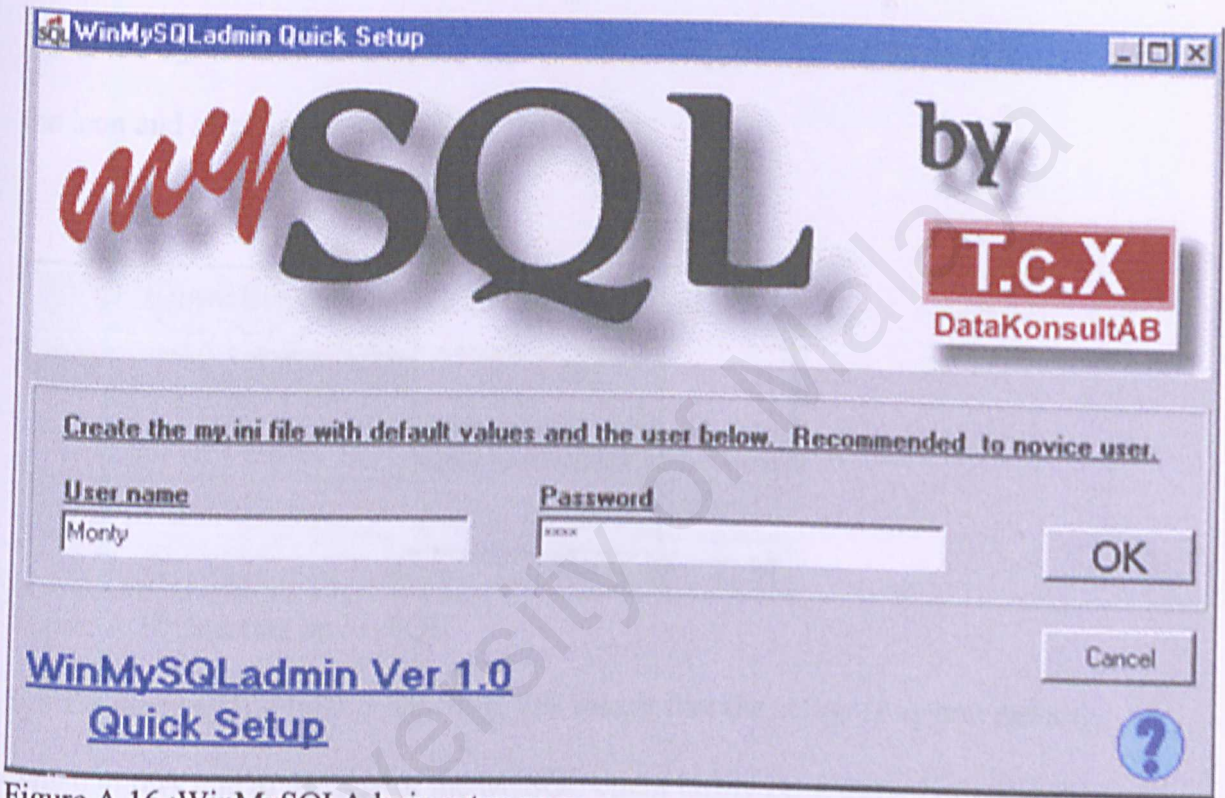


Figure A.16 :WinMySQLAdmin setup page

2.Enter your user name and password text boxes then click on the create button.

3.The my.ini file will be created, one user will be added to the grant table and a shortcut will be added to the start menu. If you are using a registered version of MySQL, mysqld-opt is the Server is the one that is chosen. The location of my.ini should be c:\windows.



4.The Quick Setup screen will close and WinMySQLAdmin will install an icon on the System Tray.Clicking on the WinMySQLAdmin icon on the System tray using either the left or right mouse button will bring up a pop-up menu.

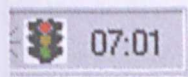


Figure A.17 :WinMySQLAdmin stop icon.

5.The red light means that the MySQL Server is stopped. To run the Server click over the icon and selecting the item Start the Server.

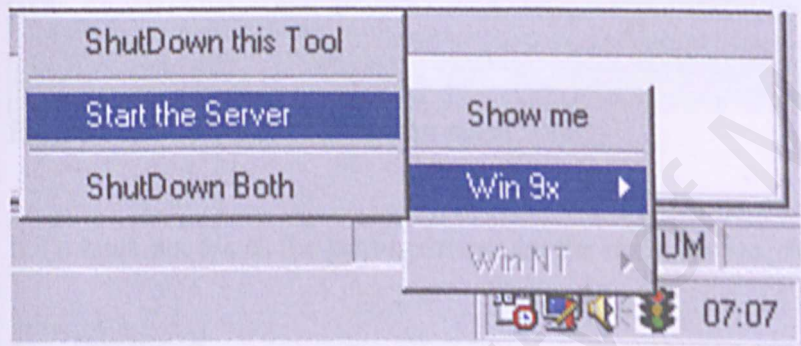


Figure A.18 :Starting up MySQL.

6.If the green traffic light is showing, this means that the server is up and running, which allows you to use any of the MySQL client utility i.e: `c:\mysql\bin\mysql -u <your username> -p<yourpassword>`

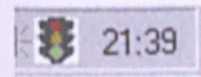


Figure A.19 :WinMySQLAdmin running icon.

7.To access the main screen, click on the 'Show Me' menu item.

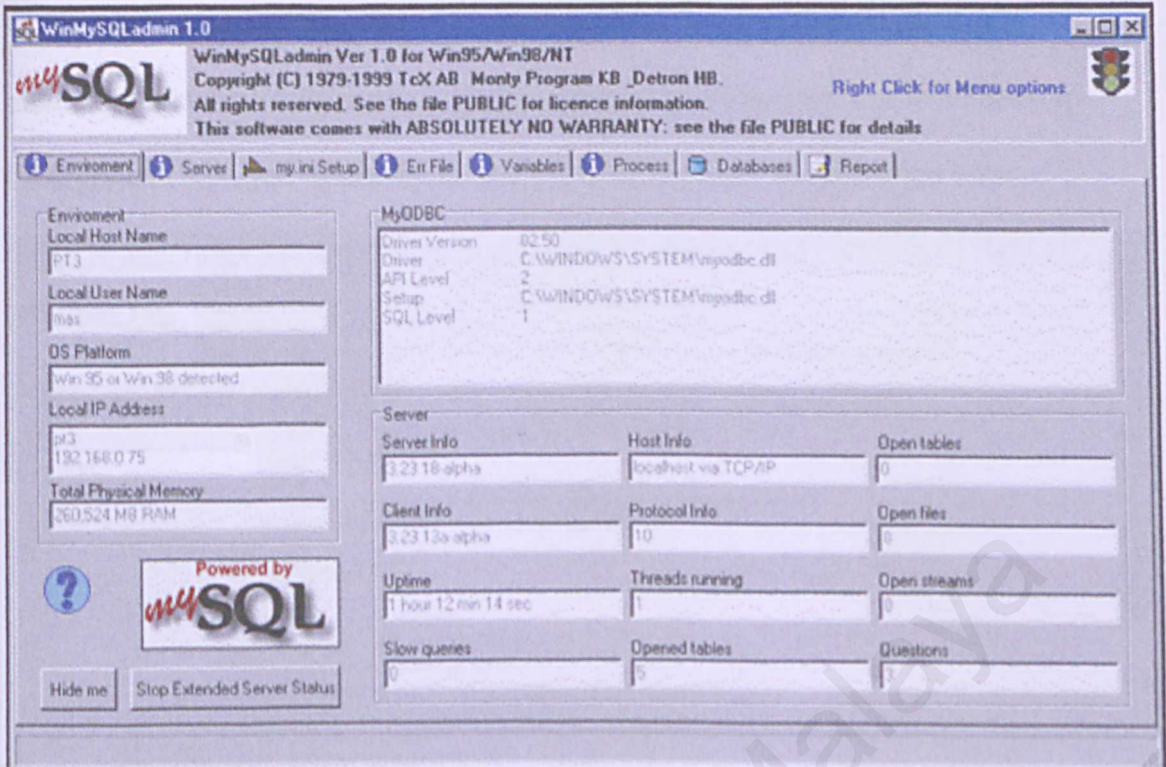
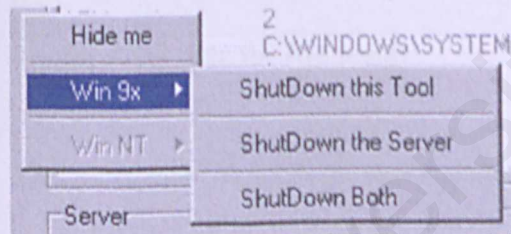


Figure A.20 :WinMySQLAdmin main screen.

8.To have access to the pop-up menu on the main screen, right click.



Stopping the tools.

9.On the Start Menu of the Windows System you should see the icon for the WinMySQLAdmin tool.



Figure A.21:WinMySQLAdmin icon.

10.This means that in the next boot of the machine, the tool will be launched and starting the server.



11.To edit my.ini file, click on my.ini Setup tab. The my.ini file screen displays a memo object which allows you to make whatever modification you feel necessary. Changes can be saved to the my.ini file pressing the Save Modification button.

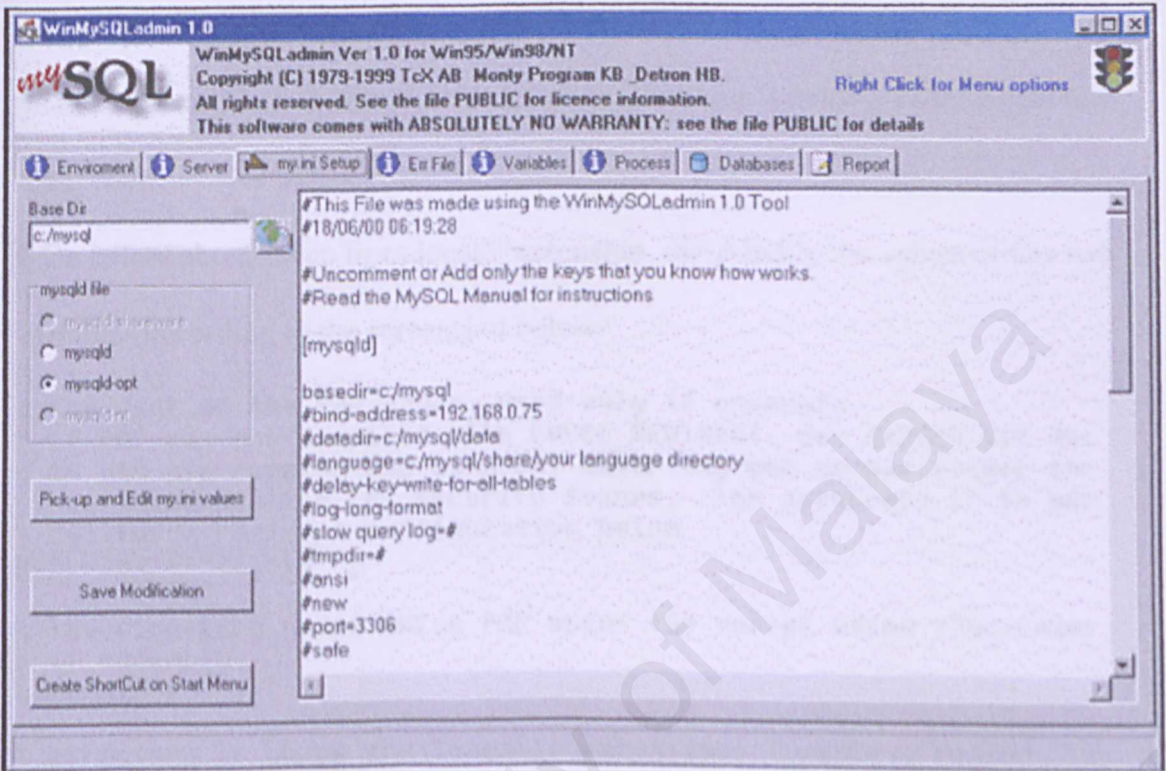


Figure A.22 :My.ini file setup

12.To change the MySQL server file, stop the server if already is running.On the group option for mysqld, select the option that you want and press Save Modification

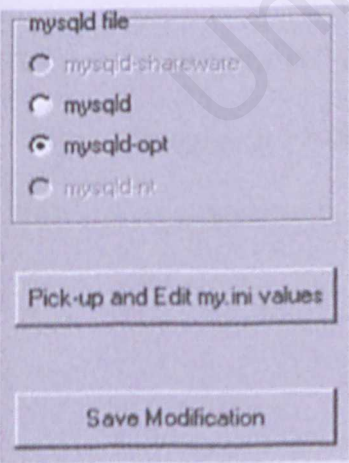


Figure A.23 :Changing the server file option.

### A.2.2 Apache Web Server

1. Create a folder in your hard drive named 'c:\web'.
2. Go into folder 'c:\php' find file 'php.ini-recommended' rename it to 'php.ini'.
3. Open the file 'php.ini' using 'Notepad'.
4. Under 'Search' click 'Find' or 'Edit' click 'Find' on Windows 98 then type this 'doc\_root'.
5. Go below about seven lines locate 'extension\_dir'. Modify the values of this two variables according to the screenshot below:

```
; The root of the PHP pages, used only if nonempty.
; if PHP was not compiled with FORCE_REDIRECT, you SHOULD set doc
; if you are running php as a CGI under any web server (other tha
; see documentation for security issues. The alternate is to use
; cgi.force_redirect configuration below
doc_root = "c:\web"

; The directory under which PHP opens the script using /~username
; if nonempty.
user_dir =

; Directory in which the loadable extensions (modules) reside.
extension_dir = "c:\php"
```

Figure A.24 : Configuration of Apache web server.

6. Now move the important file 'php4ts.dll' to c:\windows.
  7. Open the 'httpd.conf' file that we opened earlier configuring Apache.
- "Start->Programs->Apache HTTP Server 2.0.35->Configure Apache Server->Edit the Apache httpd.conf Configuration File".



8. Search for 'DocumentRoot' & 'Directory'. Modify the variables to match the following values according to the screenshot below:

```
# DocumentRoot: The directory
# documents. By default,
# symbolic links and ali
#
DocumentRoot "C:/web"
```

Figure A.25 :DocumentRoot setup.

```
#
# This should be changed to whatever you set DocumentRoot to.
#
<Directory "C:/web">
```

Figure A 26:Changing the web directory.

9. Go to the line 'AddType application/x-tar .tgz' below that line add the following:

(You can cut and paste them.)

```
ScriptAlias /php/ "c:/php/"

AddType application/x-httpd-php .php
AddType application/x-httpd-php .php3
AddType application/x-httpd-php .php4
AddType application/x-httpd-php .htm
AddType application/x-httpd-php .html
AddType application/x-httpd-php .phtml

Action application/x-httpd-php "/php/php.exe"
```

### A.2.3 PHP 4

1. Once you have the file on your hard drive, use your favorite un-zipping tool to extract the contents to, say, C:\php4\ (If you put the files in some other directory, remember to substitute that directory name as the instructions continue).

2. Take the file called "**php.ini-dist**", rename it to "**php.ini**" and move it to C:\WINDOWS\ (in Windows 98) or wherever the rest of your \*.ini files live.

3. Take the two files "**Msvcr7.dll**" and "**php4ts.dll**", and put them in C:\WINDOWS\SYSTEM\ (in Windows 98) or wherever you usually put your \*.dll files. If your system tells you that you already have "**Msvcr7.dll**" or it's currently in use, that's fine. As long as you have it, there's no issue. Forget about the other \*.dll files for now.

4. We need to go back to the Apache httpd.conf and make a few modifications to tell Apache what to do with \*.php or \*.phtml files (and how to do it). With httpd.conf open in your text editor, find a section that looks like the following:

**# ScriptAlias: This controls which directories contain server scripts.**

**# ScriptAliases are essentially the same as Aliases, except that**

**# documents in the realname directory are treated as applications and**

**# run by the server when requested rather than as documents sent to**

**# the client. The same rules about trailing "/" apply to ScriptAlias**

**# directives as to Alias.**

**#ScriptAlias /cgi-bin/ "C:/Apache/cgi-bin/"**



5. You need to add another ScriptAlias line to the end, just like this:

```
ScriptAlias /php4/ "C:/php4/"
```

6. Now find a section that looks like this:

```
# AddType allows you to tweak mime.types without actually editing it, or to
```

```
# make certain files to be certain types.
```

```
# For example, the PHP3 module (not part of the Apache distribution)
```

```
# will typically use:
```

```
#AddType application/x-httpd-php3 .phtml
```

```
#AddType application/x-httpd-php3-source .phps
```

7. This is the area where you say "for all files ending with [whatever], consider them to be of [whatever] type."

8. The section should now look something like this:

```
# AddType allows you to tweak mime.types without actually editing it, or to
```

```
# make certain files to be certain types.
```

```
# For example, the PHP3 module (not part of the Apache distribution)
```

```
# will typically use:
```

```
#AddType application/x-httpd-php3 .phtml
```

```
#AddType application/x-httpd-php3-source .phps
```

```
AddType application/x-httpd-php .php .phtml
```

```
AddType application/x-httpd-php-source .phps
```

9. And now one last modification. Find a section like this:

```
# Action lets you define media types that will execute a script whenever  
# a matching file is called. This eliminates the need for repeated URL  
# pathnames for oft-used CGI file processors.  
# Format: Action media/type /cgi-script/location  
# Format: Action handler-name /cgi-script/location
```

10. You need to include an Action line for your new file types, so that they automatically get sent through the PHP parser. So add this:

```
Action application/x-httpd-php /php4/php.exe
```

11. Save your httpd.conf file and start Apache again. If Apache is still running from the original installation, stop it first, then restart it. Provided there are no issues on startup, you should now be ready to test your installation.


12. Now, it's time to test whether PHP is running correctly. Create a file in the directory where you serve HTML documents that has the following line in it:

```
<?php phpinfo() ?>
```

Assuming that you save it with the name **test.php** to the root directory of your web site, you should see a long web page like this when you visit the URL: **localhost/test.php**.



**PHP Version 4.0.4pl1**



<b>System</b>	Linux adventure 2.2.16 #22 Fri Jun 16 16:51:24 PDT 2000 i486 unknown
<b>Build Date</b>	Feb 8 2001
<b>Configure Command</b>	'/configure' '--with-mysql' '--with-apxs=/usr/lib/apache/bin/apxs' '--with-gd'
<b>Server API</b>	Apache
<b>Virtual Directory Support</b>	disabled
<b>Configuration File (php.ini) Path</b>	/usr/local/lib
<b>ZEND_DEBUG</b>	disabled
<b>Thread Safety</b>	disabled

This program makes use of the Zend scripting language engine:  
 Zend Engine v1.0.4, Copyright (c) 1998-2000 Zend Technologies  
 with Zend Optimizer v1.0.0, Copyright (c) 1998-2000, by Zend Technologies




Figure A.27 :PHP info page.

13.If you see nothing or get an error then something went wrong.

#### A.2.4 PHPMyAdmin

1. Now, unzip the PHPMyAdmin 2.3.3 to your root directory (**htdocs** in your Apache folder) and rename it to "**admin**". Go ahead and open the **admin** folder and find the file named **config.inc.php**.

2. Open the file with WordPad (it will be all jumbled if you use NotePad) so we can make a few changes. First, find a line that looks like this (it will be relatively near the beginning of the file):

```
$cfg['PmaAbsoluteUri'] = '';
```

3. Set the URL of where-ever you are putting phpMyAdmin here. Make sure to include the full path with the / at the end otherwise it won't work. This is probably the most important part so make sure its right. Also note - put your site address between the parentheses (the ' and the other ') otherwise again it will not work.

4. We need to add the pathname to your server, so change it so it now looks like this:

```
$cfg['PmaAbsoluteUri'] = 'http://localhost/admin';
```

5. Continue by finding these two lines:

```
$cfg['Servers'][$i]['user'] = 'root';
```

```
$cfg['Servers'][$i]['password'] = '';
```



6.This is where we add your username and password you set up when you installed MySQL. Make the following changes:

```
$cfg['Servers'][$i]['user'] = 'yourUserName';
```

```
$cfg['Servers'][$i]['password'] = 'yourPassword';
```

7.Obviously put your username and password in here. Between the two ' ' again. This way when you get there it will automatically log you in. Also note if you wish to make it so it won't log you in automatically, change the setting for **advanced authentication**.

```
$cfgServers[1]['adv_auth'] = FALSE; // Use advanced authentication?
```

8.That is the advanced authentication setting. Change the word **false** into **true** to require you to enter in your login details (and server details) every time you want to check your database. This is obviously much more safer than if you leave it as open. Also note that if you use Advanced Authentication, **do not enter your password** into the password section of the configuration file (below the username). Remove it. Leave the username there though. When you've set it properly it should look like this;

```
$cfgServers[1]['adv_auth'] = TRUE; // Use advanced authentication?
```

9.Finally, save the file and open your browser to:

<http://localhost/admin/index.php> If all was successful, you will see a welcome page!

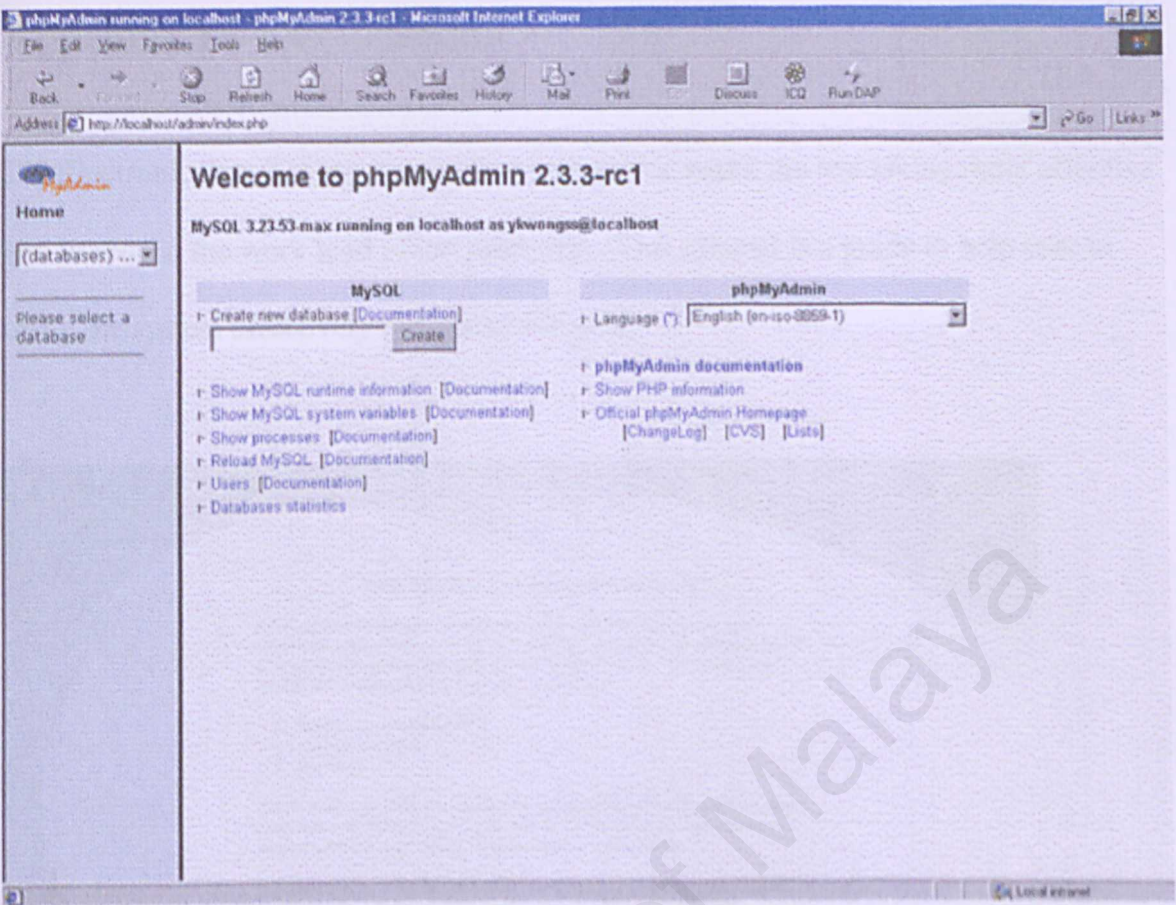


Figure A.28 :PHPMysql welcome page.



## Appendix B: User Manual

JPJ Electronic Test Taking is an online system that make the test taking more effective and to reduce the work load of the procedure. This manual is a guide to help user to using the system effectively to achieve the goal.

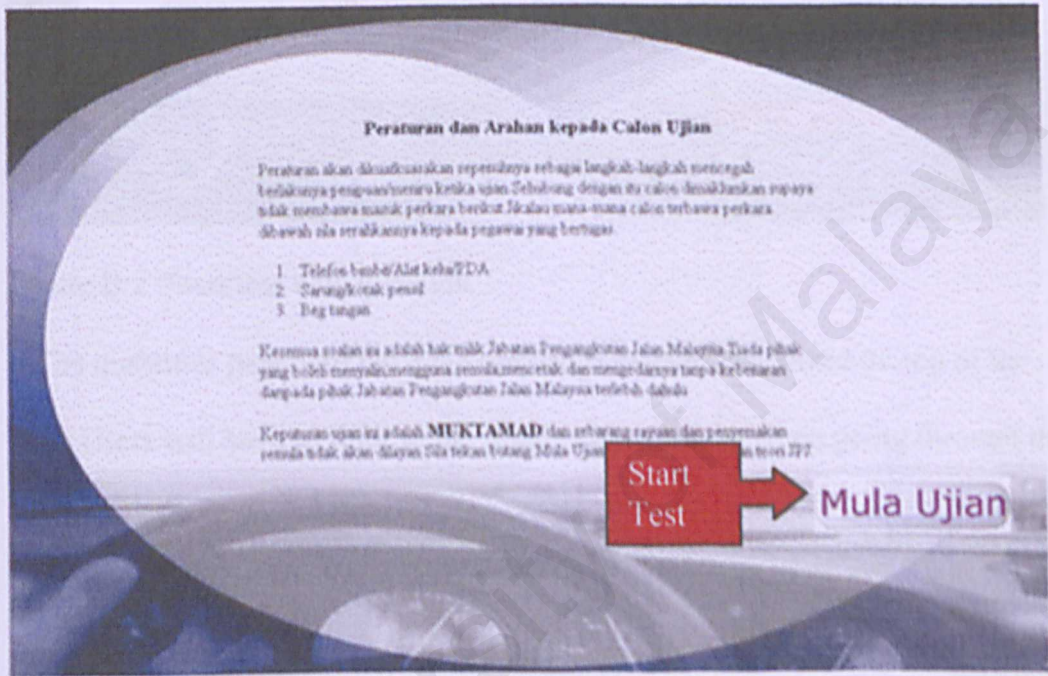


Figure B.1:Start test screen

1.Before the users start the test,a the terms and conditions of the test is display to them.This is to notify the users of the condition applied when taking the test.To start the test users need to click on the Mula Ujian button on the lower right conner of the main page.After clicking the button the page will take the users to the first question.

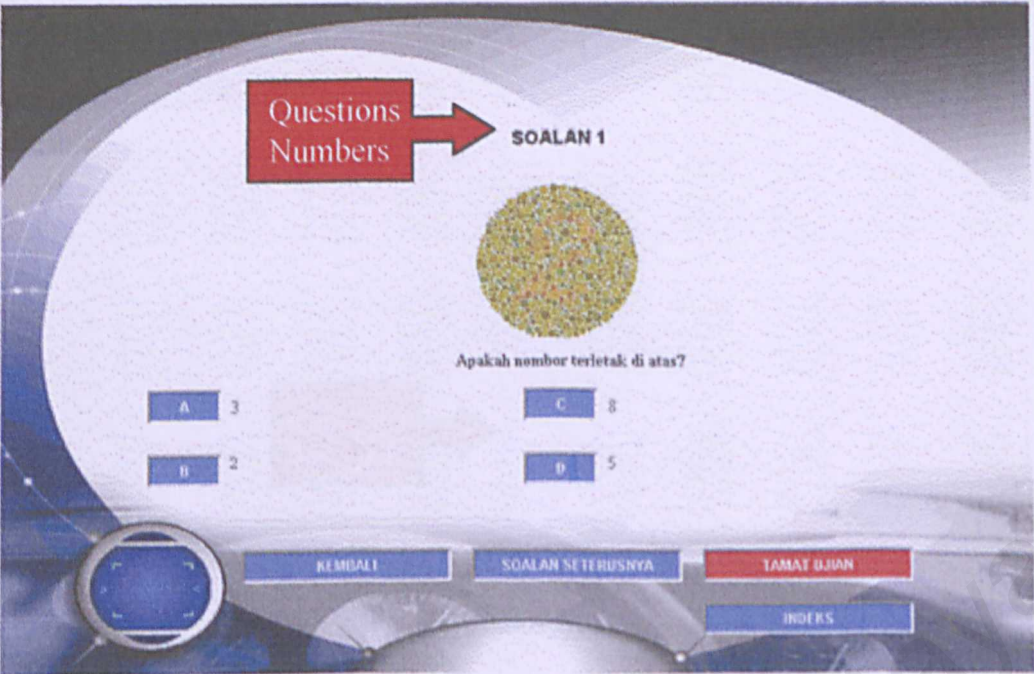


Figure B.2 :Start test with question .

2.The questions page will have it's questions number displayed on top of the page.Users will have to refer to the number of question when going through the test.

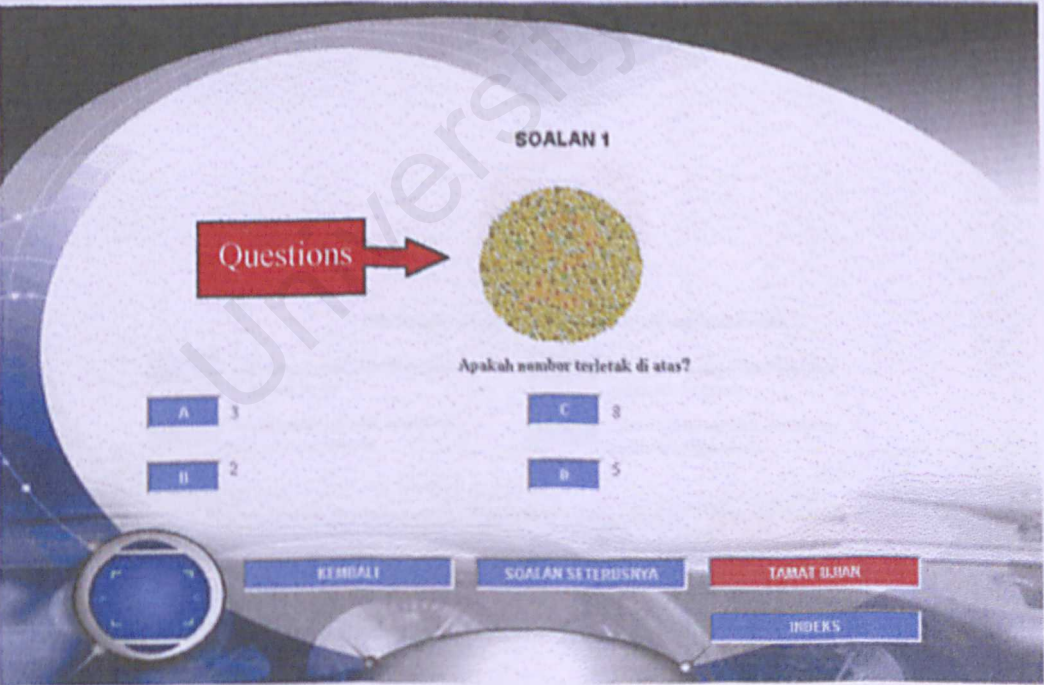


Figure B.3 :Reading the questions

3.User can read the questions display in the center of the page.



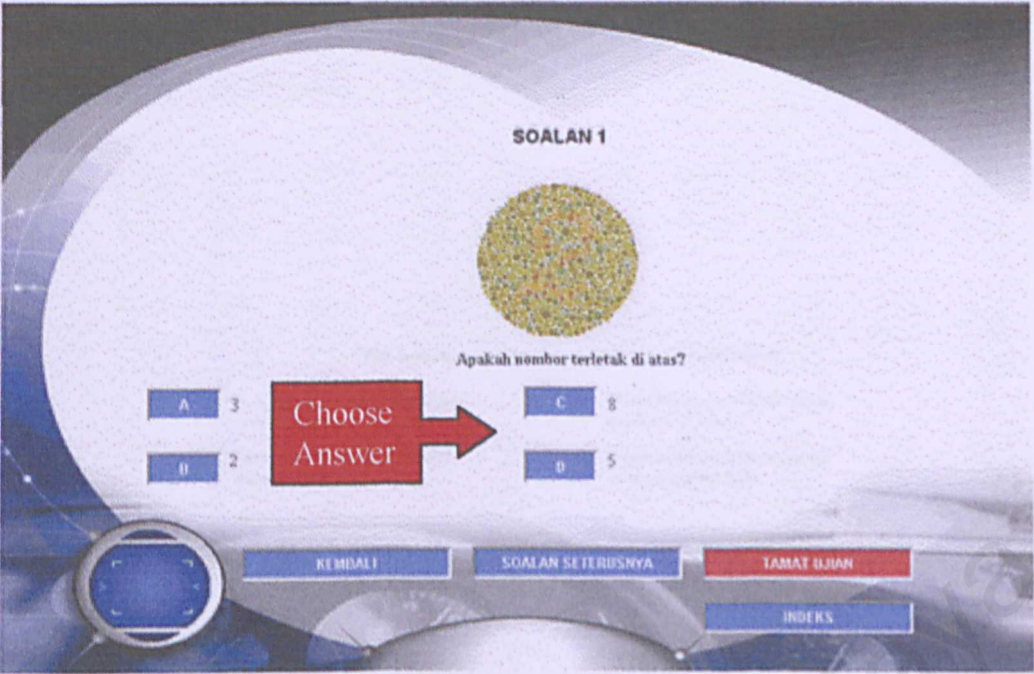


Figure B.4: Questions with multiple choice of answers.

4. The multiple choice of answer and users can choose their answers by just clicking the answers button.

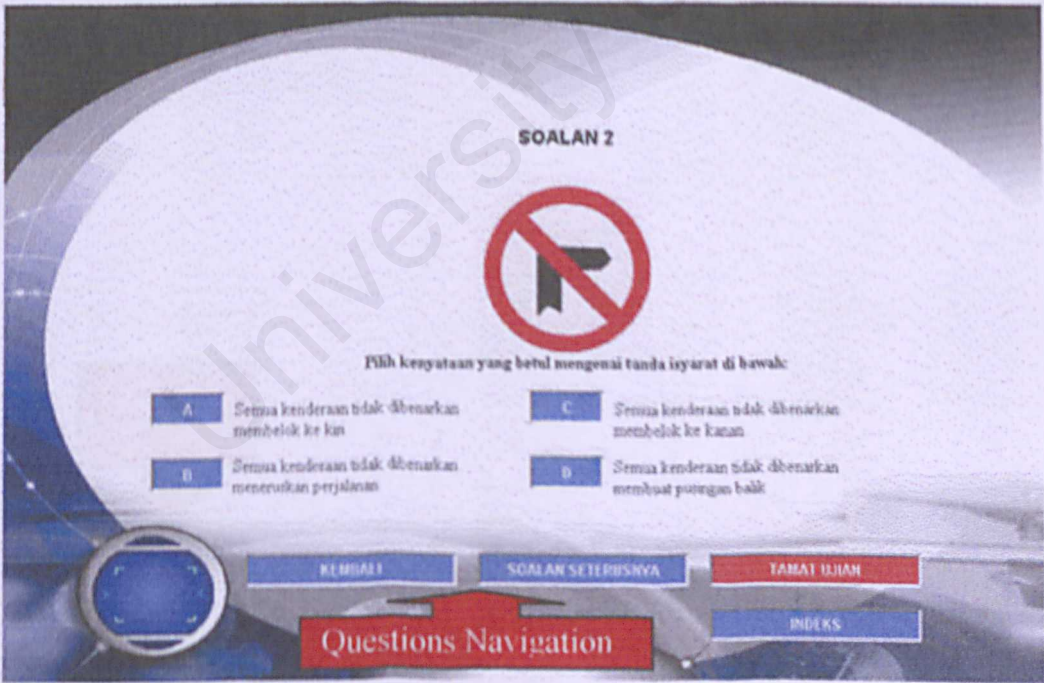


Figure B.5 Navigation of the questions

5. Users can use the navigation button to go through the questions

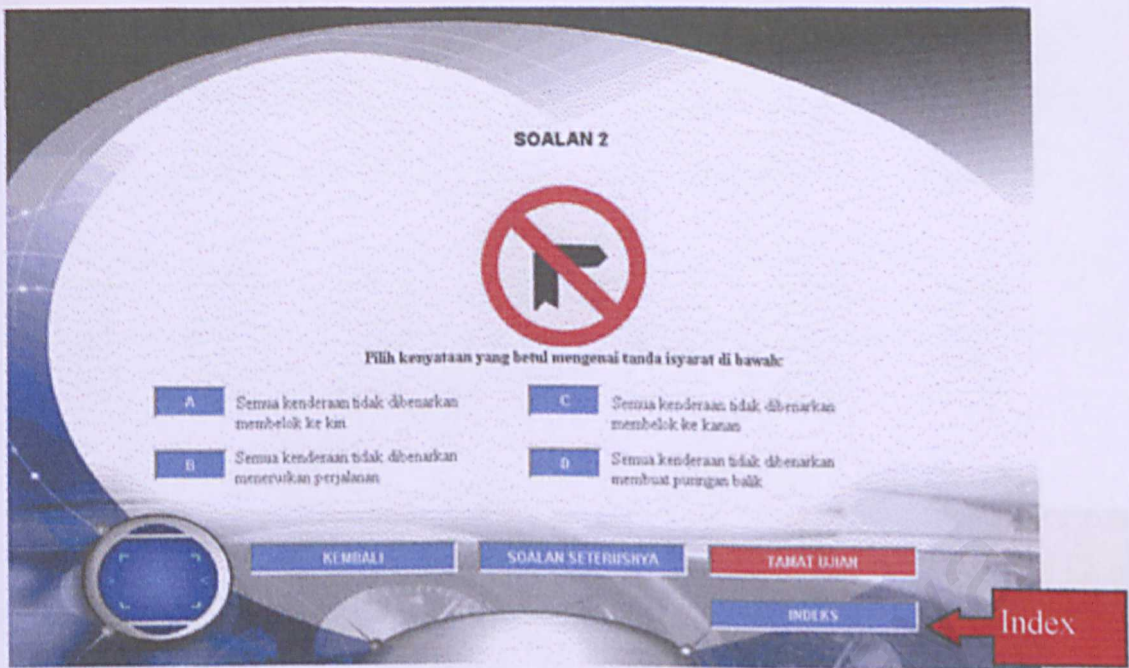


Figure B.6:Using index to navigate or check questions

6.To make navigation easier and faster user can use the indeks button to direct to indeks page.It is also used to check unanswered questions.

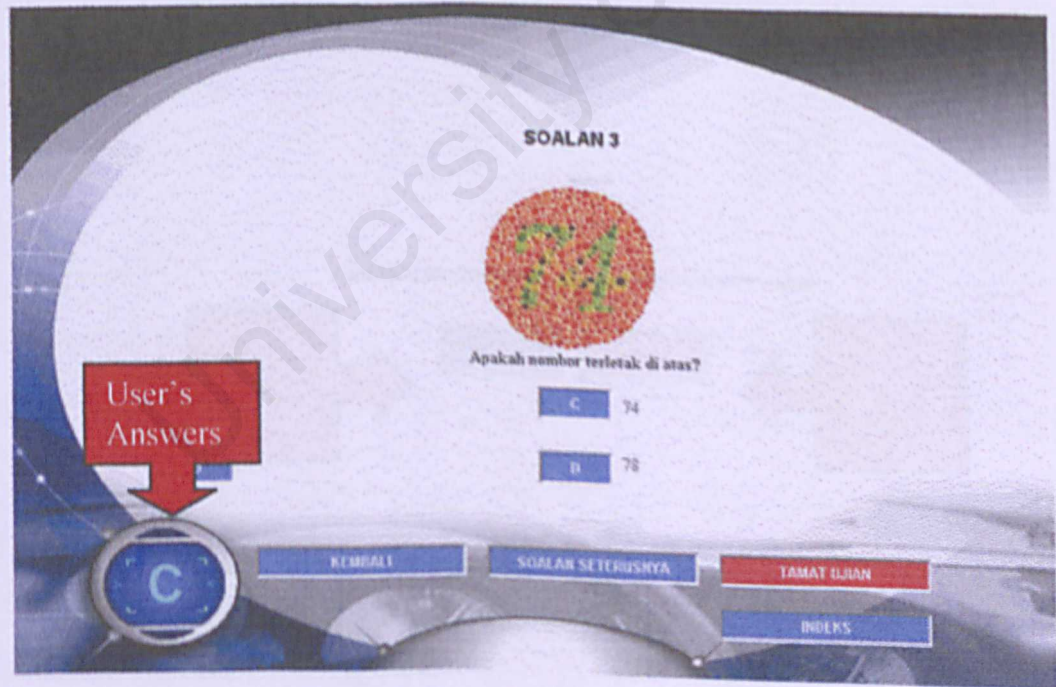


Figure B.7:Display the answers choosen.

7.User can see their chosen answer display on the page to check their answer inputs.



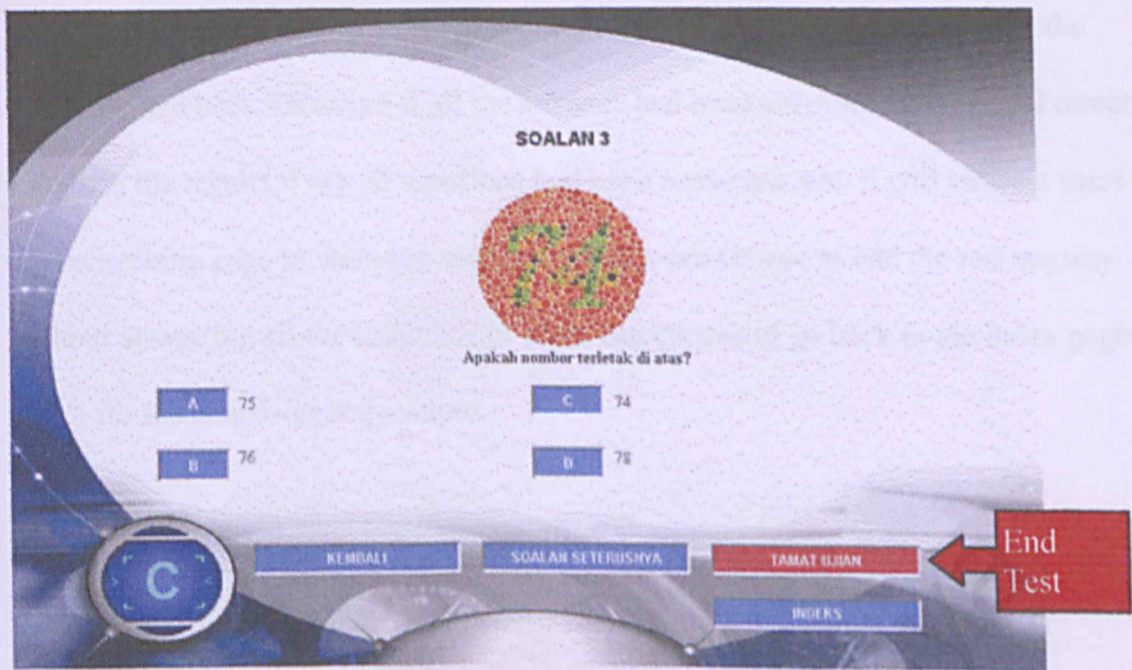


Figure B.8:Finish the test

8. When all the questions are answered the user can end their test by clicking the Tamat Ujian button. It will redirect users to their result checking page.

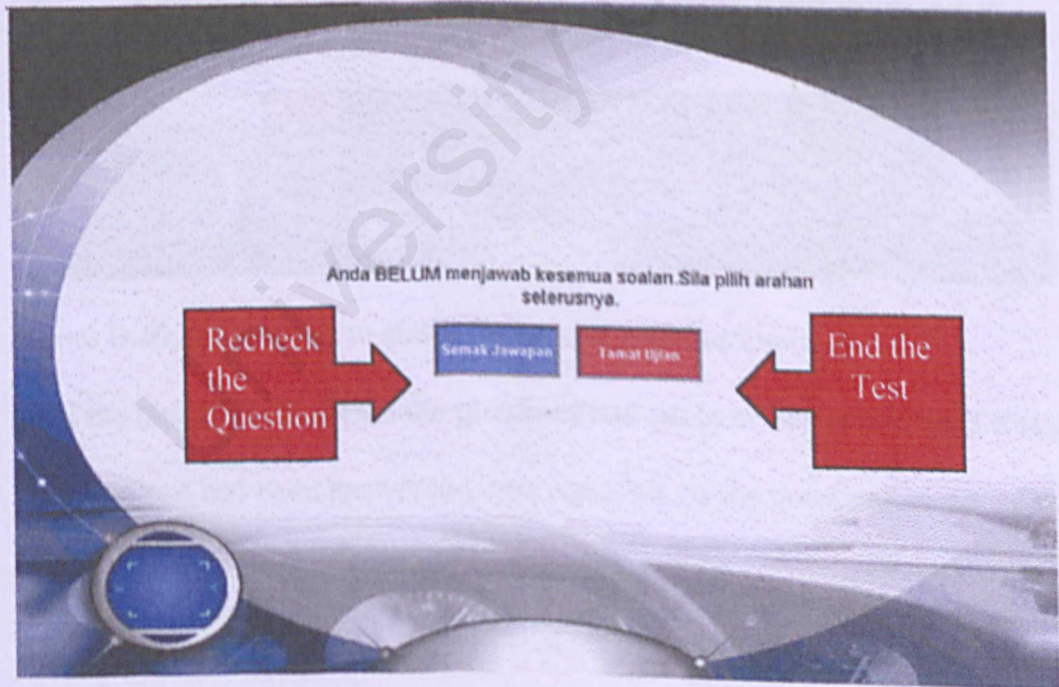


Figure B.9:Check unanswered questions

When the Tamat Ujian button is clicked the system will check whether all the the questions had been answered.If all the answers had been submitted tehn it will directly calculate the results.If not all questions had been answered tehn it will redirect users to the rechecking page to warn the users.Here users can choose to end the test anyway without answering all the questions or users can choose to go back to the index page to check for the unanswered questions.



Figure B.10:Indeks page to check for unanswered questions.

10.If the button is red means the questions had yet to be answered.But if it is green then the questions had been answered.Users can click on the questions numbers to go to their desired question to recheck the answers



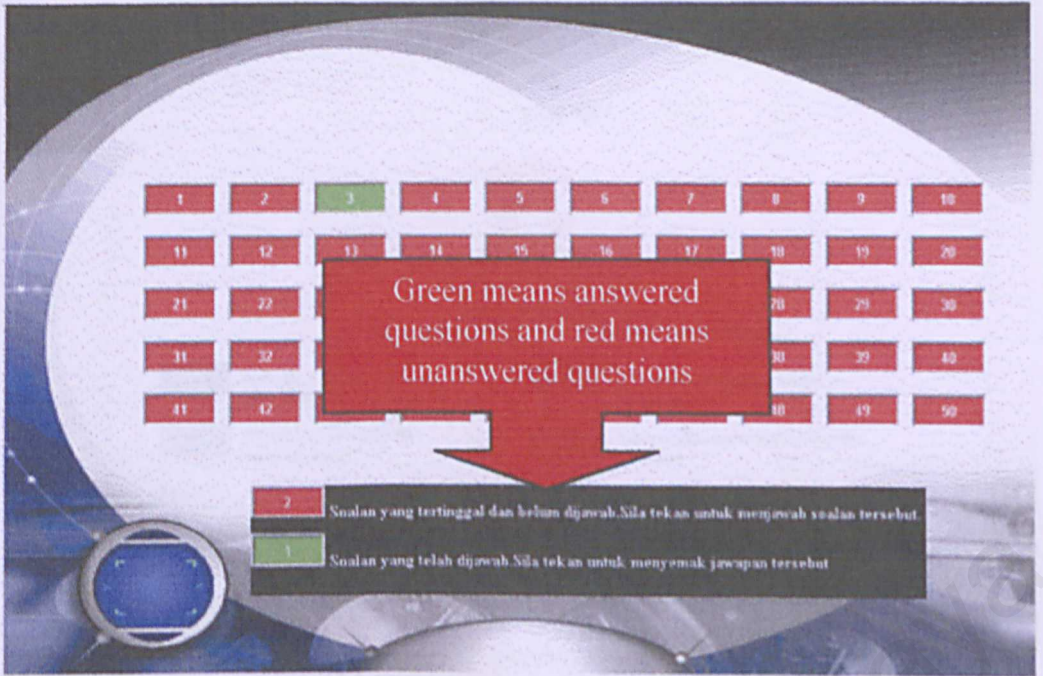


Figure B.11:Index page legends

The red button means unanswered questions and green means answered questions.



Figure B.12:Users results.

12.Users can get their results instantly and get advise from counter for further actions.

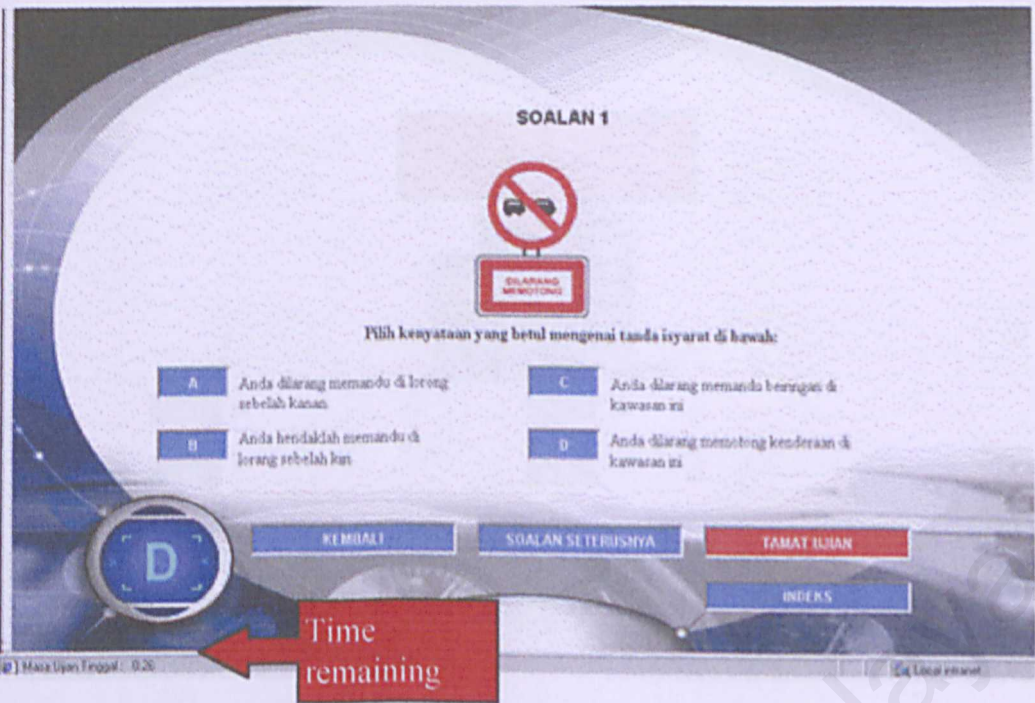


Figure B.13:Time remaining to take the test.

13.The time remaining for the test is display on the status bar.It will give the users reminder on how much time is left on the test before it ends.



Figure B.14:Status bar displaying the remaining time.



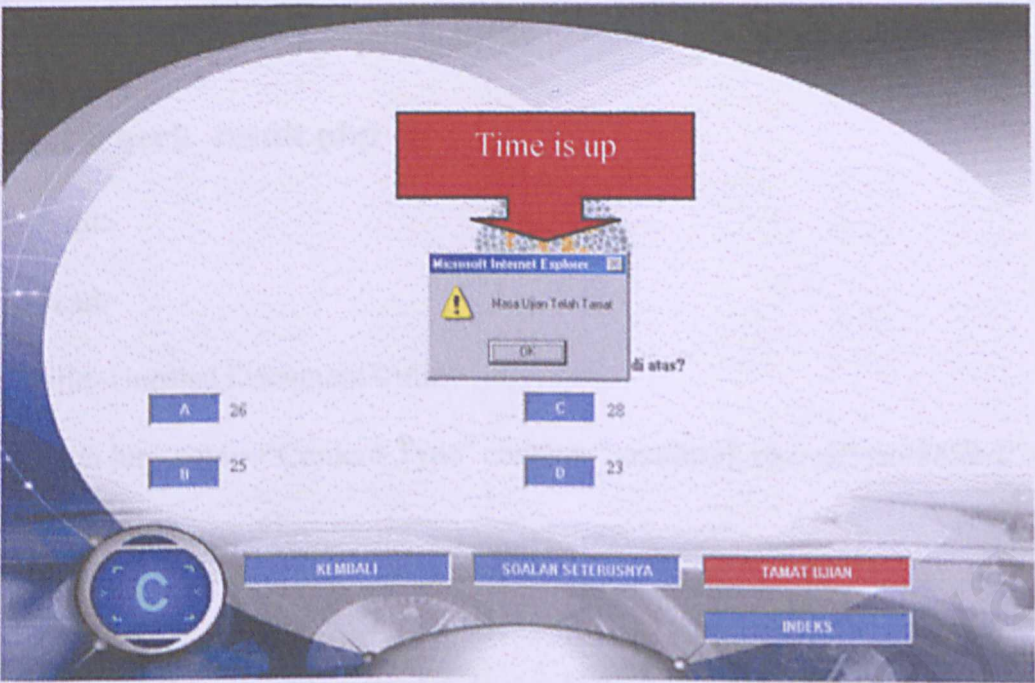


Figure B15:The time is up.

14. When the time is up a prompt window will lock all the buttons and users click on the prompt window's ok button it will redirect users to the result checking page and the test ends.

## Appendix C: Sample Codes

### C.1 Check\_result.php

```
<html>

<head>

<title>Untitled Document</title>

<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">

<script language="JavaScript" type="text/JavaScript">

<!--

function MM_reloadPage(init) { //reloads the window if Nav4 resized

    if (init==true) with (navigator) {if

((appName=="Netscape")&&(parseInt(appVersion)==4)) {

        document.MM_pgW=innerWidth; document.MM_pgH=innerHeight;

onresize=MM_reloadPage; }}

        else if (innerWidth!=document.MM_pgW || innerHeight!=document.MM_pgH)

location.reload();

    }

MM_reloadPage(true);

//-->

</script>

</head>

<body background="Assets/Background1.jpg">

<?php
```



```
$m=0;

$Score=0;

$conn=mysql_connect();

if(!$conn)

    echo "Connection failed!";

else

    echo"Connected to database!";

mysql_select_db('jpjtest');

$answer="SELECT MasterListNum,Answer,QuesSection FROM masterlist_ques

ORDER BY MasterListNum";

$result=mysql_query($answer);

while (list($MasterListNum,$Answer,$QuesSection)=mysql_fetch_row($result)){

    $Compare[$m]=$Answer;

    $m++;

}

for ($k=0;$k<9;$k++)

    echo "$Compare[$k]";

mysql_close($conn);

session_start();

for ($k=0;$k<5;$k++){

    echo "Question $Rand[$k]";

    echo "answer is $Answer[$k]";
```

```

if ($Answer[$k]==$Compare[$Rand[$k]]){
    $Score++;
}

else
    $Score=$Score;
}

echo "The mark u get is $Score";
$result_per=round($Score/5)*100;
if ($result_per>=80){
    $galus=LULUS;
}

else
    $galus=GAGAL;

session_destroy();
?>

<div id="Layer1" style="position:absolute; left:437px; top:187px; width:107px;
height:92px; z-index:1">

<FONT color=#00FFF size=10 face=Arial style="position:absolute; left:45; top:20;
"><?php echo "<B>$result_per%</B>"; ?></FONT>

</div>

```



```
<div id="Layer2" style="position:absolute; left:310px; top:294px; width:442px; height:154px; z-index:2">
```

```
  <div align="center"><strong><font size="+3" face="Times New Roman, Times, serif">Anda telah <?php echo "<BR>$galus</BR>"; ?> dalam ujian teori ini.Sila dapatkan nasihat di kaunter.</font></strong></div>
```

```
</div>
```

```
<div id="Layer3" style="position:absolute; left:364px; top:148px; width:338px; height:29px; z-index:3">
```

```
  <div align="center"><strong><font size="+3" face="Times New Roman, Times, serif">Keputusan Ujian Anda </font></strong></div>
```

```
</div>
```

```
</body>
```

```
</html>
```

## C.2 Check\_Unfinish.php

```
session_start();

for ($j=0;$j<5;$j++){

$Finish=0;

    if ($checked[$j]==0)

        break; //immediately terminate the loop and Finish=0

    else

        $Finish=1;

}

switch ($Finish) {

    case "0":

        header ("location: http://localhost/Jpj_Test/JPJTEST/Unfinished.html");

        break;

    default:

        header ("location: http://localhost/Jpj_Test/JPJTEST/check_result.php");

}
```



### C.3 Indeks.php

```
session_start();

//session_register("c");

for ($a=0;$a<5;$a++){

    for ($b=1;$b<=10;$b++){

        $c=$b+($a*10)-1;

        if ( $checked[$c]==1){            ?>

<input type="button" name="indeks" value="<?php $d=$c+1; echo "$d"; ?>"

CLASS="colornormal"

ONCLICK="window.location.href='http://localhost/Jpj_Test/JPJTEST/indeks_directpa
ge.php?val=<?=$c;?>','"

        onmouseover = this.className="colorover"

        onmouseout = this.className="colornormal">

        &nbsp;

<?php                                }

        else { ?>
```

```
<input type="button" name="indeks" value="<?php $d=$c+1; echo "$d"; ?>"
```

```
CLASS="tamatcolornormal"
```

```
ONCLICK="window.location.href='http://localhost/Jpj_Test/JPJTEST/indeks_directpa
```

```
ge.php?val=<?=$c;?>';"
```

```
onmouseover = this.className="tamatcolorover"
```

```
onmouseout = this.className="tamatcolornormal">
```

```
&nbsp;
```

```
<?php }
```

```
} ?>
```

```
<BR>
```

```
<?php } ?>
```



## C.4 Main.html

```
session_start();

session_register("Rand");

session_register('min');

session_register('max');


function section($min,$max,$num_of_ques,$start_num){

    global $Rand;

    for($i=$min,$k=0;$k<=$max-$min;$i++,$k++){

        $Rand_ques[$k]="$i"; //Assign path to array

    }

    //Get a random number

    function Get_rand($min,$max){

        srand(((double)microtime()*1000000));

        $num=rand($min,$max);

        return ($num);

    }

    //check for duplicate number

    for ($k=0;$k<$num_of_ques;$k++){

        $flag=1;

        $j=0;

        $num=Get_rand($min,$max);

        do{
```

```

if($Rand_ques[$j]==$num){
    $flag=0;
    $k=$k-1;
}
$j=$j+1;
if ($flag==1)
    $Rand_ques[$k]=$num;
    //echo "$Rand_num[$k]";
    }while($j<$k);
}

//Assign shuffled element into an array
for ($k=$min;$k<$num_of_ques;$k++)
    for($i=$start_num,$k=0;$k<=$num_of_ques;$start_num++,$k++){
        $Rand[$start_num]=$Rand_ques[$k];
    }
echo "\n";
unset($Rand_ques);
}

section($min=0,$max=34,$num_of_ques=34,$start_num=0); //section1=question 1-15

```



## C.5 Timer.php

```
<Script Language="JavaScript">

settimes();

function display(){

    rtime=etime-ctime;

    if (rtime>60)

        m=parseInt(rtime/60);

    else{

        m=0;

    }

    s=parseInt(rtime-m*60);

    if(s<10)

        s="0"+s

    window.status="Masa Ujian Tinggal : "+m+"."+s

    window.setTimeout("checktime()",1000)

}

function settimes(){

    etime=<?php echo "$finish"; ?>-1043337600;

    checktime();

}

function checktime(){

    var time= new Date();

    hours= time.getHours();
```

```
mins= time.getMinutes();

secs= time.getSeconds();

ctime=hours*3600+mins*60+secs

if(ctime>=etime){

expired();

}

else

display();

}

function expired(){

alert("Masa Ujian Telah Tamat");

location.href="check_result.php"; //Put here the next page

}

</Script>
```



## C.6 next1.php

```
session_start();

session_register("Rand");

session_register("i");

session_register("checked");

session_register('finish');

$i=0;

$cur_time=time();

while ($cur_time>1043411815){           //1043411815 is time base on 24.1.2003
$cur_time=$cur_time-86400;           //subtract continuously 86400second(1 day) to
                                     compensate for elapse time since 24.1.2003
}

$done=$cur_time;                       //assign $done as if it currently still
is 24.1.2003

$finish= $done+300;                   //add any time elapse desire here in
seconds

if ($i==0){
    $k=$i+1;
}

//assign 0 to all unanswered question.

for ($k=0;$k<49;$k++){ $checked[$k]=0;

header("Location: http://localhost/Jpj_Test/JPJTEST/Ques_{$Rand[$i].php}");
```

### C.7 next2.php

```
session_start();

session_register("Rand");

session_register("i");

session_register("Answer");

session_register("checked");

session_register("User_Answer");

//next page

if(isset($next)){

    if ($i==49){        //loopback the question

        $i=0;

        $k=$i+1;

    }

    else if($i>=0&&$i<49){

        $i=$i+1;

        $k=$i+1;

    }

}

else if(isset($back)){

    if ($i==0){

        $i=49;

        $k=$i+1;

    }

}
```



C.8 Ques\_1.php

```
else if($i>0&&$i<=49){  
    $i=$i-1;  
    $k=$i+1;  
}  
$i=$i--; //reduce page count by 1  
}  
else if (isset($answer)){  
    $m=$i+1;  
    $Answer[$i]=$answer;           //assign answer to $Answer array for final  
                                   checking of results  
    $checked[$i]=1;               //assign 1 to answered question  
                                   }  
header("Location: http://localhost/Jpj_Test/JPJTEST/Ques_ $Rand[$i].php");
```

## C.8 Ques\_1.php

```
<html>
```

```
<head>
```

```
<style>
```

```
.colornormal {
```

```
    background-color:0066ff;
```

```
    width:70px;
```

```
    height:30px;
```

```
    color:white;
```

```
    font-family: Arial;
```

```
    font-size: 10pt;
```

```
    font-weight: bold;
```

```
    border: 3 inset white;
```

```
}
```

```
.colorover {
```

```
    background-color: 0000dd;
```

```
    width:70px;
```

```
    height:30px;
```

```
    color:white;
```

```
    text-decoration:none;
```

```
    font-family: Arial;
```

```
    font-size: 10pt;
```

```
    font-weight: bold;
```



```
border: 3 inset black;
}

.tamatcolornormal {
    background-Color:#FF0033;
    width:70px;
    height:30px;
    color:white;
    font-family: Arial;
    font-size: 10pt;
    font-weight: bold;
    border: 3 inset white;
}

.tamatcolorover {
    background-Color: #CC0033;
    width:70px;
    height:30px;
    color:white;
    text-decoration:none;
    font-family: Arial;
    font-size: 10pt;
    font-weight: bold;
    border: 3 inset black;
}
```

```
</style>

<title>JPJ Theory Test</title>

<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">

<script language="JavaScript" type="text/JavaScript">

<!--

function MM_reloadPage(init) { //reloads the window if Nav4 resized
  if (init==true) with (navigator) {if
((appName=="Netscape")&&(parseInt(appVersion)==4)) {
    document.MM_pgW=innerWidth; document.MM_pgH=innerHeight;
onresize=MM_reloadPage; }}
  else if (innerWidth!=document.MM_pgW || innerHeight!=document.MM_pgH)
location.reload();
}
MM_reloadPage(true);

//-->

</script>

</head>

<?php
session_start();

?>

<Script Language="JavaScript">

settimes();

function display(){
```



```
rtime=etime-ctime;

if (rtime>60)

m=parseInt(rtime/60);

else{

m=0;

}

s=parseInt(rtime-m*60);

if(s<10)

s="0"+s

window.status="Masa Ujian Tinggal : "+m+"."+s

window.setTimeout("checktime()",1000)

}

function settimes(){

etime=<?php echo "$finish"; ?>-1043337600;

checktime();

}

function checktime(){

var time= new Date();

hours= time.getHours();

mins= time.getMinutes();

secs= time.getSeconds();

ctime=hours*3600+mins*60+secs

if(ctime>=etime){
```

```
expired();

}

else

display();

}

function expired(){

alert("Masa Ujian Telah Tamat");

location.href="check_result.php"; //Put here the next page

}

</Script>

<body background="Assets/Background2.jpg" >

<?php

session_start();

?>

<div id="Layer1" style="position:absolute; left:499px; top:115px; width:111px;

height:29px; z-index:1"><font size="4" face="Arial, Helvetica, sans-

serif"><strong>SOALAN

<?php $a=$i+1; echo "$a"; ?> </strong></font></div>

<div id="Layer2" style="position:absolute; left:456px; top:164px; width:178px;

height:140px; z-index:2"></div>

<div id="Layer3" style="position:absolute; left:333px; top:323px; width:404px;

height:42px; z-index:3">

<div align="center"><strong>Apakah nombor terletak di atas?</strong></div>
```



```
</div>

<div id="Layer4" style="position:absolute; left:229px; top:366px; width:234px;
height:44px; z-index:4">5</div>

<div id="Layer5" style="position:absolute; left:228px; top:418px; width:234px;
height:47px; z-index:5">3</div>

<div id="Layer4" style="position:absolute; left:590px; top:367px; width:256px;
height:44px; z-index:4">8</div>

<div id="Layer4" style="position:absolute; left:589px; top:421px; width:258px;
height:44px; z-index:4">6</div>

</body>

</html>

<FONT color=#00FFF size=10 face=Arial style="position:absolute; top:517;
left:136;"><?php echo "<B>$Answer[$i]</B>"; ?></FONT>

<FORM ACTION="next2.php" METHOD="post">

<input type="submit" name="answer" value="A" CLASS="colornormal"
style="position:absolute; top:360; left:150;"
onmouseover = this.className="colorover"
onmouseout = this.className="colornormal">

<input type="submit" name="answer" value="B" CLASS="colornormal"
style="position:absolute; top:420; left:150;"
onmouseover = this.className="colorover"
onmouseout = this.className="colornormal">
```

```
<input type="submit" name="answer" value="C" CLASS="colornormal"
style="position:absolute; top:360; left:510;"
onmouseover = this.className="colorover"
onmouseout = this.className="colornormal">
<input type="submit" name="answer" value="D" CLASS="colornormal"
style="position:absolute; top:420; left:510;"
onmouseover = this.className="colorover"
onmouseout = this.className="colornormal">
<input type="submit" name="next" value="SOALAN SETERUSNYA"
CLASS="colornormal" style="width:200; height:30; position:absolute; top:510;
left:460;"
onmouseover = this.className="colorover"
onmouseout = this.className="colornormal">
<input type="submit" name="back" value="KEMBALI" CLASS="colornormal"
style="width:200; height:30; position:absolute; top:510; left:240;"
onmouseover = this.className="colorover"
onmouseout = this.className="colornormal">
</FORM>
<FORM action="Check_Unfinish.php" method="post">
<input type="submit" name="tamam" value="TAMAT UJIAN"
CLASS="tamatcolornormal" style="width:200; height:30; position:absolute; top:510;
left:680;"
onmouseover = this.className="tamatcolorover"
```



onmouseout = this.className="tamatacolornormal">

</FORM>

<FORM action="indeks.php" method="post">

<input type="submit" name="indeks" value="INDEKS" CLASS="colornormal"

style="width:200; height:30; position:absolute; top:560; left:680;"

onmouseover = this.className="colorover"

onmouseout = this.className="colornormal">

</FORM>

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